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October 1, 2001

William J. Curtis
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EMAIL wcurtis@
thompsoncoburn.com

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Carlyn Winter Prisk (3HS11)
U.S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

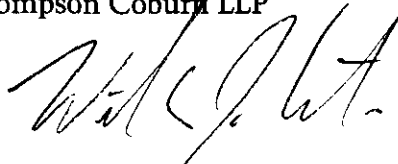
Re: Lower Darby Creek Area Superfund Site - Clearview Landfill, Folcroft Landfill, and
Folcroft Landfill Annex; Solutia Inc.'s Supplemental Response to EPA's 104(e)
Information Request

Dear Ms. Winter Park:

This transmittal letter and attached enclosures supplements Solutia Inc.'s ("Solutia") August 30, 2001 response to EPA's August 15 104(e) request for information. Please continue to forward all communications regarding this site to Brent J. Gilhousen, Assistant General Counsel Environmental. Mr. Gilhousen is located at 575 Maryville Centre Drive, St. Louis Mo. 63141.

Very truly yours,

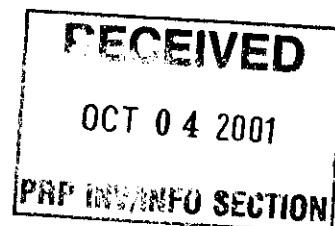
Thompson Coburn LLP

By 
William J. Curtis

wjc/wjc

Enclosures

cc: Brent J. Gilhousen



ORIGINAL
Sent

**SUPPLEMENTAL RESPONSE TO REQUEST FOR INFORMATION:
LOWER DARBY CREEK AREA SUPERFUND SITE – CLEARVIEW LANDFILL,
FOLCROFT LANDFILL, AND FOLCROFT LANDFILL ANNEX**

Pursuant to a telephone conversation between counsel for Solutia, William Curtis and counsel for EPA, Brian Nishitanib on September 10, 2001, Solutia's response will only addresses the former Monsanto's land disposal activities between 1958 and 1976. Accordingly, Solutia is not providing documents or information regarding water discharges or air emissions from its plants in the greater Philadelphia area. As agreed, Solutia is not required to provide this information because all of the former Monsanto facilities in the greater Philadelphia area are located east of the Delaware River, while the Lower Darby Creek area is west of the Delaware River. Thus, Monsanto's wastewater discharges could not contribute to the alleged contamination in Lower Darby Creek. However, attached are document that primarily discuss Solutia's water discharges because the documents briefly discuss land disposal.

As explained in the previous response, Monsanto Company ("Monsanto"), now known as Pharmacia Corporation ("Pharmacia"), spun-off its chemical businesses into a separate and publicly held corporation named Solutia Inc. ("Solutia"), which came into existence on or about September 1, 1997. At that time, Solutia agreed to undertake certain representations relative to businesses that became assets of Solutia. Among those obligation is to respond to inquiries such as information request received by EPA pursuant to 42 U.S.C. § 9604(e).

Solutia generally objects to the overly broad and unduly burdensome nature of the questions included in the August 8, 2001, request for information propounded by the U.S. Environmental Protection Agency ("EPA"), which was received by Solutia on August 15, 2001. Solutia also objects to the instructions and definitions included in the request for information as exceeding the scope of EPA's authority for purposes of a hazardous waste disposal site information request. Finally, Solutia objects that EPA's information request contains undefined or improperly defined terms, rendering the questions vague and ambiguous, overly broad and unduly burdensome. These objections are continuing in nature, and apply to each and every response to EPA's information request. Notwithstanding these objections, Solutia provides the responses as set forth below.

RESPONSE TO QUESTIONS

- 1. State the name of your company, its mailing address, and telephone number.
Further identify:**

- a. The dates and states of incorporation of your company;**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001.

b. The date and original state of incorporation of your company; and

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001.

c. The parent corporation of your company, if any, and all subsidiaries or other affiliated entities.

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001.

- 2. What is the current nature of the business or activity conducted at your establishment(s) in the Philadelphia, Pennsylvania area? What was the nature of Monsanto's business or activity between 1958 and 1976? Please describe in detail. If the nature of your business or activity changed from the period of 1958 to 1976 to the present, please provide a detailed explanation of the changes to date.**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001.

- 3. Identify all persons currently or formerly employed by Solutia or Monsanto who have or may have personal knowledge of your operations and waste disposal practices between 1958 and 1976 at your facilities in the Philadelphia, Pennsylvania area. For each such person, state that person's employer, job title, dates of employment, current address, and telephone number. If the current telephone number or address is not available, provide the last known telephone number or last known address of such person.**

Response:

Should the United States desire to contact any of the below listed individuals, because Solutia is represented by counsel in this matter, Solutia request that our counsel first be contacted.

Camden, NJ

Richard W. Savage

Pharmacia – Technical Services Supervisor (dates employed 9/10/74 to 4/13/93)

[REDACTED]

[REDACTED]

David C. Dieterich

Pharmacia – Plant Manager (dates employed 6/13/51 to 2/28/92)

[REDACTED]

[REDACTED]

Lewis E. Graff

Pharmacia – Maintenance Supervisor (dates employed 9/17/74 to 1/29/93)

[REDACTED]

[REDACTED]

Kearny, NJ

Donald M. Widdows

Pharmacia – Chief Chemist (dates employed 9/16/63 to 10/31/85)

[REDACTED]

[REDACTED]

David C. Dieterich

Pharmacia – Production Supervisor (dates employed 6/13/51 to 2/28/92)

[REDACTED]

[REDACTED]

George E. Kupchinsky

Pharmacia – Plant Manager (dates employed 10/28/57 to 1/3/84)

[REDACTED]

[REDACTED] 31

Kenilworth, NJ

John A. McNaboe

Pharmacia – Process Technical Sup. (dates employed 6/23/69 to 2/13/81)

[REDACTED]
James C. Rademaker
Pharmacia – Plant Manager (dates employed 6/20/66 to 12/1/93)
[REDACTED]

Joseph F. Payne
Pharmacia – Purchasing Specialist (dates employed 7/31/46 to 3/31/79)
[REDACTED]

Garrett C. Maney
Pharmacia – Traffic Supervisor (dates employed 11/20/67 to 10/31/77)
[REDACTED]

Yardville, NJ

Thomas A. Nebel
Pharmacia – Supt. Plant Eng. & Maint. (dates employed 4/7/69 to 8/1/93)
[REDACTED]

Lester Mount
Pharmacia – Plant Manager (dates 6/15/53 to 3/31/82)
[REDACTED]

Ronald P. Hoffer
Pharmacia – Supt. Services (dates 5/15/72 to 8/31/87)
[REDACTED]

The original pages can
be found in PFE.
This information has
been redacted b/c it
contains data protected by
the privacy act.

Delaware River (Bridgeport, NJ)

Edward S. Jamro
Pharmacia and current Solutia Inc. employee (began employment 4/11/75)
Engineering Specialist Pollution Control
[REDACTED]

Joseph F. Valley
Pharmacia – Purchasing Agent (dates employed 4/11/66 to 9/30/91)

Jeffrey D. Felder
Pharmacia and current Solutia Inc. employee (began employment 1/27/75)
Environmental Specialist Pollution Control

4. Identify the owners and operators of your establishment(s) in the Philadelphia, Pennsylvania area from 1958 to the present. For each owner and operator further provide.

- a. The dates of their operation;

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001.

- b. The nature of their operation; and

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001.

- c. All information or documents relating to the handling and/or generation, storage, treatment, recycling, formulation, disposal, or transportation of any hazardous substance, hazardous waste, pollutant, contaminant, or other waste during the period in which they were operating the establishment(s).

Response:

Pursuant to a telephone conversation between counsel for Solutia, William Curtis and counsel for EPA, Brian Nishitanib on September 10, 2001, Solutia's response will only addresses the former Monsanto's land disposal activities between 1958 and 1976. Accordingly, Solutia is not providing documents or information regarding water discharges or air emissions from its plants in the greater Philadelphia area. As agreed,

Solutia is not required to provide this information because all of the former Monsanto facilities in the greater Philadelphia area are located east of the Delaware River, while the Lower Darby Creek area is west of the Delaware River. Thus, Monsanto's wastewater discharges could not contribute to the alleged contamination in Lower Darby Creek. However, attached are document that primarily discuss Solutia's water discharges because the documents briefly discuss land disposal.

Camden Facility. See documents at Tab A.

Delaware River Facility. See documents at Tab B.

Kearney Facility. See documents at Tab C.

Kenilworth Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

Yardville Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

5. **Describe the types of documents generated or maintained by your establishment(s) in the Philadelphia, Pennsylvania area concerning the handling and/or generation, storage, treatment, transportation, recycling, formulation, or disposal of any hazardous substance, hazardous waste, pollutant, contaminant or other waste between 1958 and 1976.**
 - a. **Provide a description of the information included in each type of document and identify the person who was/is the custodian of the documents;**

Response:

Pursuant to a telephone conversation between counsel for Solutia, William Curtis and counsel for EPA, Brian Nishitanib on September 10, 2001, Solutia's response will only addresses the former Monsanto's land disposal activities between 1958 and 1976. Accordingly, Solutia is not providing documents or information regarding water discharges or air emissions from its plants in the greater Philadelphia area. As agreed, Solutia is not required to provide this information because all of the former Monsanto facilities in the greater Philadelphia area are located east of the Delaware River, while the Lower Darby Creek area is west of the Delaware River. Thus, Monsanto's wastewater discharges could not contribute to the alleged contamination in Lower Darby Creek. However, attached are document that primarily discuss Solutia's water discharges because the documents briefly discuss land disposal.

For a description of the documents, see documents in tabs A, B, C.

Sharon Williams
Law Department
575 Maryville Centre Drive
St. Louis, Mo. 63141

Janet Tracey
Environmental, Safety and Health
575 Maryville Centre Drive
St. Louis, Mo. 63141

- b. Describe any permits or permit applications and any correspondence between your company and/or establishment(s), and any regulatory agencies regarding the transportation and disposal of such wastes; and**

Response:

Pursuant to a telephone conversation between counsel for Solutia, William Curtis and counsel for EPA, Brian Nishitanib on September 10, 2001, Solutia's response will only address the former Monsanto's land disposal activities between 1958 and 1976. Accordingly, Solutia is not providing documents or information regarding water discharges or air emissions from its plants in the greater Philadelphia area. As agreed, Solutia is not required to provide this information because all of the former Monsanto facilities in the greater Philadelphia area are located east of the Delaware River, while the Lower Darby Creek area is west of the Delaware River. Thus, Monsanto's wastewater discharges could not contribute to the alleged contamination in Lower Darby Creek. However, attached are documents that primarily discuss Solutia's water discharges because the documents briefly discuss land disposal.

Camden Facility. See documents at Tab A.

Delaware River Facility. See documents at Tab B.

Kearney Facility. See documents at Tab C.

Kenilworth Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

Yardville Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

- c. Describe any contracts or correspondence between your company and/or establishment(s) and any other company or entity regarding the transportation and disposal of such wastes.**

Response:

Pursuant to a telephone conversation between counsel for Solutia, William Curtis and counsel for EPA, Brian Nishitanib on September 10, 2001, Solutia's response will only addresses the former Monsanto's land disposal activities between 1958 and 1976. Accordingly, Solutia is not providing documents or information regarding water discharges or air emissions from its plants in the greater Philadelphia area. As agreed, Solutia is not required to provide this information because all of the former Monsanto facilities in the greater Philadelphia area are located east of the Delaware River, while the Lower Darby Creek area is west of the Delaware River. Thus, Monsanto's wastewater discharges could not contribute to the alleged contamination in Lower Darby Creek. However, attached are document that primarily discuss Solutia's water discharges because the documents briefly discuss land disposal.

Camden Facility. See documents at Tab A.

Delaware River Facility. See documents at Tab B.

Kearney Facility. See documents at Tab C.

Kenilworth Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

Yardville Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

- 6. Identify every hazardous substance used, generated, purchased, stored, or otherwise handled at your establishment(s) in the Philadelphia, Pennsylvania area between 1958 and 1976. Provide chemical analyses and Material Safety Data Sheets ("MSDS"). With respect to each such hazardous substance, further identify:**
- a. The process(es) in which each hazardous substance was used, generated, purchased, stored, or otherwise handled;**
 - b. The chemical composition, characteristics, and physical state (solid, liquid, or gas) of each such hazardous substance;**
 - c. The annual quantity of each such hazardous substance used, generated, purchased, stored, or otherwise handled;**
 - d. The beginning and ending dates of the period(s) during which such hazardous substance was used, generated, purchased, stored, or otherwise handled;**
 - e. The types and sizes of containers in which these substances were transported and stored; and**

- f. The persons or companies that supplied each such hazardous substance to your company.**

Response:

Pursuant to a telephone conversation between counsel for Solutia, William Curtis and counsel for EPA, Brian Nishitanib on September 10, 2001, Solutia's response will only addresses the former Monsanto's land disposal activities between 1958 and 1976. Accordingly, Solutia is not providing documents or information regarding water discharges or air emissions from its plants in the greater Philadelphia area. As agreed, Solutia is not required to provide this information because all of the former Monsanto facilities in the greater Philadelphia area are located east of the Delaware River, while the Lower Darby Creek area is west of the Delaware River. Thus, Monsanto's wastewater discharges could not contribute to the alleged contamination in Lower Darby Creek. However, attached are document that primarily discuss Solutia's water discharges because the documents briefly discuss land disposal.

Camden Facility. See documents at Tab A.

Delaware River Facility. See documents at Tab B.

Kearney Facility. See documents at Tab C.

Kenilworth Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

Yardville Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

The MSDS are located at Tab D.

- 7. Identify all by-products and wastes generated, stored, transported, treated, disposed of, released, or otherwise handled by your establishment(s) in the Philadelphia, Pennsylvania area between 1958 and 1976. With respect to each such by-product and waste identified, further provide:**
- a. The process(es) in which each such by-product and waste was generated, stored, transported, treated, disposed of, released, or otherwise handled;**
 - b. The chemical composition, characteristics, and physical state (solid, liquid, or gas) of each such by-product or waste;**
 - c. The annual quantities of each such by-product and waste generated, stored, transported, treated, disposed of, released, or otherwise handled;**

- d. **The types, sizes, and numbers of containers used to treat, store, or dispose of each such by-product or waste;**
- e. **The name of the individual(s) and/or company(ies) that disposed of or treated each such by-product or waste; and**
- f. **The location and method of treatment and/or disposal of each such by-product or waste.**

Response:

Pursuant to a telephone conversation between counsel for Solutia, William Curtis and counsel for EPA, Brian Nishitanib on September 10, 2001, Solutia's response will only addresses the former Monsanto's land disposal activities between 1958 and 1976. Accordingly, Solutia is not providing documents or information regarding water discharges or air emissions from its plants in the greater Philadelphia area. As agreed, Solutia is not required to provide this information because all of the former Monsanto facilities in the greater Philadelphia area are located east of the Delaware River, while the Lower Darby Creek area is west of the Delaware River. Thus, Monsanto's wastewater discharges could not contribute to the alleged contamination in Lower Darby Creek. However, attached are document that primarily discuss Solutia's water discharges because the documents briefly discuss land disposal.

Camden Facility. See documents at Tab A.

Delaware River Facility. See documents at Tab B.

Kearney Facility. See documents at Tab C.

Kenilworth Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

Yardville Facility. After a thorough and diligent investigation, no documents or information responsive to this inquiry have been located.

8. **Did you company ever contract with, or make arrangements with Clearview, Folcroft, Folcroft Annex, Eastern Industrial, Tri-County Hauling, S. Buckly Trash Hauling, Barratt Rupert, McCloskey Engineering, Marvin Jonas, Jonas [Waster] Waste Removal, Schiavo Bros., Inc., ADM Disposal Services and/or any other company or municipality to remove or transport material from your establishment(s) in the Philadelphia, Pennsylvania area between 1958 and 1976 for disposal? If so, for each transaction identified above, please identify:**

- a. **The person with whom you made such a contract or arrangement;**

- b. **The date(s) on which or time period during which such material was removed or transported for disposal;**
- c. **The nature of such material, including the chemical content, characteristics, and physical state (i.e., liquid, solid, or gas);**
- d. **The annual quantity (number of loads, gallons, drums) of such material;**
- e. **The manner in which such material was containerized for shipment or disposal;**
- f. **The location to which such material was transported for disposal;**
- g. **The person(s) who selected the location to which such material was transported for disposal;**
- h. **The individuals employed with any transporter identified (including truck drivers, dispatchers, managers, etc.) with whom your establishment dealt concerning removal or transportation of such material; and**
- i. **Any billing information and documents (invoices, trip tickets, manifests, etc.) in your possession regarding arrangements made to remove or transport such material**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001

9. **Provide the names, titles, areas of responsibility, addresses, and telephone numbers of all persons who, between 1958 and 1976, may have:**
- a. **Disposed of or treated materials at Clearview, Folcroft and Folcroft Annex or other areas of the Site;**
 - b. **Arranged for the disposal or treatment of materials at Clearview, Folcroft and Folcroft Annex or other areas of the Site; and/or**
 - c. **Arranged for the transportation of materials to Clearview, Folcroft and Folcroft Annex or other areas of the Site (either directly or through transshipment points) for disposal or treatment.**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001

10. **For every instance in which your establishment(s) disposed of or treated material at Clearview, Folcroft and Folcroft Annex or other areas of the Site, or arranged for the disposal or treatment of material at the Site, Identify:**
- a. **The date(s) on which such material was disposed of or treated at the Site;**
 - b. **The nature of such material, including the chemical content, characteristics, and physical state (i.e., liquid, solid, or gas);**
 - c. **The annual quantity (number of loads, gallons, drums) of such material;**
 - d. **The specific location on the Site where such material was disposed of or treated; and**
 - e. **Any billing information and documents (invoices, trip tickets, manifests, etc.) in your company's or establishment's(s') possession regarding arrangements made to dispose of or treat such material at the Site.**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001

11. **Did your establishment(s), or any other company or individual ever spill or cause a release of any chemicals, hazardous substances, and/or hazardous waste, and/or non-hazardous solid waste on any portion of Clearview, Folcroft and Folcroft Annex or any other portion of the Site? If so, identify the following:**
- a. **The date(s) of the spill(s)/release(s) occurred;**
 - b. **The composition (i.e., chemical analysis) of the materials which were spilled/released;**
 - c. **The response made by you or on your behalf with respect to the spill(s)/release(s); and**
 - d. **The packaging, transportation, and final disposition of the materials which were spilled, released.**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001

- 12. Please identify individuals employed by your establishment(s) who were responsible for arranging for the removal and disposal of wastes, and individuals who were responsible for payments, payment approvals, and record keeping concerning such waste removal transactions at your Philadelphia, Pennsylvania area establishment(s) between 1958 and 1976. Provide current or last known addresses and telephone numbers where they may be reached. If these individuals are the same persons identified by your answer to questions 3, so indicate.**

Response:

See response to question #3.

- 13. Did you or any person or entity on your behalf ever conduct any environmental assessments or investigations relating to contamination at Clearview, Folcroft and Folcroft Annex or any other areas of the Site? If so, please provide all documents pertaining to such assessments or investigations.**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001

- 14. If you have any information about other parties who may have information which may assist the EPA in its investigation of the Site, including Clearview, Folcroft and Folcroft Annex, or who may be responsible for the generation of, transportation to, or release of contamination at the Site, please provide such information. The information you provide in response to this request should include the party's name, address, telephone number, type of business, and the reasons why you believe the party may have contributed to the contamination at the Site or may have information regarding the Site.**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001

- 15. Representative of your establishment(s):**

- a. **Identify the person(s) answering these questions on behalf of your establishment(s) including full name, mailing address, business telephone number, and relationship to the company.**

Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001

William J. Curtis, Esq.
Thompson Coburn LLP
1 Firststar Plaza
St. Louis, Mo. 63101

- b. **Provide the name, title, current address, and telephone number of the individual representing your establishment(s) to whom future correspondence or telephone calls should be directed.**

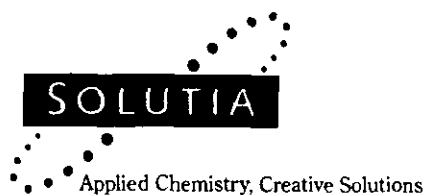
Response:

See Solutia's Response to Request for Information: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex, dated August 30, 2001

16. **If any of the documents solicited in this information request are no longer available, please indicate the reason why they are no longer available. If the records were destroyed, provide us with the following:**
 - a. **Your document retention policy;**
 - b. **A description of how the records were/are destroyed (burned, archived, trashed, etc.) and the approximate date of destruction;**
 - c. **A description of the type of information that would have been contained in the documents; and**
 - d. **The name, job title, and most current address known to you of the person(s) who would have produced these documents, the person(s) who would have been responsible for the retention of these documents; and the person(s) who would have been responsible for the destruction of these documents.**

Response:

See Tab E.



Brent J. Gilhousen
Assistant General Counsel – Environmental
Direct Dial: 314-674-8504
Facsimile: 314-674-5588
bjgilh@solutia.com

Solutia Inc.
575 Maryville Centre Drive
St. Louis, Missouri 63141

P.O. Box 66760
St. Louis, Missouri 63166-6760
Tel 314-674-1000

August 30, 2001

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Carlyn Winter Prisk (3HS11)
U.S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Re: Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill,
And Folcroft Landfill Annex; Solutia Inc.'s Response to EPA's § 104(e)
Information Request

Dear Ms. Winter Prisk:

This transmittal letter and attached 104(e) response timely responds to a U.S. Environmental Protection Agency ("EPA") fifteen day request for information, addressed to "Monsanto Company c/o Solutia Inc." (hereinafter "Solutia") concerning the Lower Darby Creek Area Superfund Site – Clearview Landfill, Folcroft Landfill, and Folcroft Landfill Annex located in Delaware and Philadelphia Counties, Pennsylvania (hereinafter the "Site"). Solutia received the request on August 15, 2001.

Effective September 1, 1997, Monsanto Company ("Monsanto"), now known as Pharmacia Corporation ("Pharmacia"), spun off certain of its chemical businesses into a separate company, Solutia Inc. Solutia is a publicly held corporation incorporated in Delaware. Under the separation agreement between the two parties, Solutia agreed to indemnify Pharmacia for certain liabilities related to its chemical businesses.

In response to EPA's information request, Solutia disagrees with EPA's overly broad assumption of authority, which EPA asserts is conferred by the Comprehensive Environmental Response, Compensation & Liability Act ("CERCLA"), 42 U.S.C. § 9601 *et seq.*, and other laws. Solutia also objects to the overly broad scope of the questions and definitions included within EPA's information request.

However, Solutia is responding to EPA's request in accordance with Solutia's policy of cooperating with legitimate investigations by government agencies. Therefore, Solutia is voluntarily responding to your request, but at the same time not waiving any objections to EPA's statement of authority or the scope of information requested.

On May 28 and July 1, 1987, Pharmacia (formerly Monsanto Company) responded to a Section 104(e) Request from the EPA regarding the Tinicum Marsh/Folcroft Landfill, Folcroft, Pennsylvania. At that time, Pharmacia did a thorough review of all operating facilities and corporate records and found no information which indicated that any materials generated by Pharmacia were disposed of at the Tinicum Marsh/Folcroft Landfill site (see Attachments A & B).

Solutia is again undertaking a comprehensive, good faith search for information regarding the potential connection to the Site at issue. A diligent inquiry, since the physical breakup of the two companies is ongoing. A supplemental reply will be forthcoming when that inquiry is complete.

To aid in our review, and particularly in light of the complete absence of information in its records indicating any relationship to the Site, Solutia hereby requests, pursuant to the Freedom of Information Act, that EPA provide Solutia with copies of any documents or a description of any other information in EPA's possession which has led EPA to include Solutia as a recipient of the Section 104(e) Request for the Site. At the present time, however, the only information available to Solutia indicates that it is not responsible for any materials or wastes, including those that might contain hazardous substances, located at the Site.

Please forward all future communications regarding this site to the undersigned.

If you have any questions regarding this matter, please contact me directly at the telephone number shown above.

Sincerely,



Brent J. Gilhousen
Assistant General Counsel
Environmental

Enclosures

10/10/01

RESPONSE TO REQUEST FOR INFORMATION:
LOWER DARBY CREEK AREA SUPERFUND SITE – CLEARVIEW LANDFILL,
FOLCROFT LANDFILL, AND FOLCROFT LANDFILL ANNEX

On May 28 and July 1, 1987, Pharmacia (formerly Monsanto Company) responded to a Section 104(e) Request from the EPA regarding the Tinicum Marsh/Folcroft Landfill, Folcroft, Pennsylvania. At that time, Pharmacia did a thorough review of all operating facilities and corporate records and found no information which indicated that any materials generated by Pharmacia were disposed of at the Tinicum Marsh/Folcroft Landfill site (Attachments A & B). Solutia is again undertaking a comprehensive, good faith search for information regarding the potential connection to the Site at issue. A diligent inquiry, since the physical breakup of the two companies is ongoing. To date, Solutia has been unable to locate evidence that indicates Pharmacia sent any material to the Site.

As explained in the letter accompanying this response, Monsanto Company ("Monsanto"), now known as Pharmacia Corporation ("Pharmacia"), spun-off its chemical businesses into a separate and publicly held corporation named Solutia Inc. ("Solutia"), which came into existence on or about September 1, 1997. At that time, Solutia agreed to undertake certain representations relative to businesses that became assets of Solutia. Among those obligation is to respond to inquiries such as information request received by EPA pursuant to 42 U.S.C. § 9604(e).

Solutia generally objects to the overly broad and unduly burdensome nature of the questions included in the August 8, 2001, request for information propounded by the U.S. Environmental Protection Agency ("EPA"), which was received by Solutia on August 15, 2001. Solutia also objects to the instructions and definitions included in the request for information as exceeding the scope of EPA's authority for purposes of a hazardous waste disposal site information request. Finally, Solutia objects that EPA's information request contains undefined or improperly-defined terms, rendering the questions vague and ambiguous, overly broad and unduly burdensome. These objections are continuing in nature, and apply to each and every response to EPA's information request. Notwithstanding these objections, Solutia provides the responses as set forth below.

RESPONSES TO QUESTIONS

1. State the name of your company, its mailing address, and telephone number.

Response: The correct legal name of this Company responding to this 104(e) request is:

Solutia Inc.

Further identify:

a. The dates and states of incorporation of your company;

Response: Solutia was incorporated in the state of Delaware on April 1, 1997.

b. The date and original state of incorporation of your company; and

Response: Solutia was incorporated in the state of Delaware on April 1, 1997.

c. The parent corporation of your company, if any, and all subsidiaries or other affiliated entities.

Response: Solutia is not a subsidiary or affiliate of any other entity. There currently exists a multitude of subsidiaries and affiliates of the parent corporation, Solutia Inc., organized and operated throughout the world. Information and data on each individual subsidiary is far beyond the appropriate scope of inquiry in connection with the Site and to the extent such information is requested, Solutia hereby objects to said request.

We have conducted a careful and thorough investigation of available records to identify those entities within Solutia that may have had dealings with the Site.

- 2. What is the current nature of the business or activity conducted at your establishment(s) in the Philadelphia, Pennsylvania area? What was the nature of Monsanto's business or activity between 1958 and 1976? Please describe in detail. If the nature of your business or activity changed from the period of 1958 to 1976 to the present, please provide a detailed explanation of the changes to date.**

Response: The current nature of Solutia's business is primarily manufacturing, refining, and processing a variety of industrial, commercial and consumer chemical products. Solutia did not exist during the referenced time period from 1958 to 1976, however, Pharmacia's business activity between 1958 and 1976 was primarily manufacturing, refining and processing a variety of industrial, commercial and consumer chemical products. The nature of the business has not changed since 1958, although some operating facilities in the Philadelphia, Pennsylvania area were sold or closed over that time period.

- 3. Identify all persons currently or formerly employed by Solutia or Monsanto who have or may have personal knowledge of your operations and waste disposal practices between 1958 and 1976 at your facilities in the Philadelphia, Pennsylvania area. For each such person, state that person's employer, job title, dates of employment, current address, and telephone number. If the current telephone number or address is not available, provide the last known telephone number or last known address of such person.**

Response: To be supplemented.

4. **Identify the owners and operators of your establishment(s) in the Philadelphia, Pennsylvania area from 1958 to the present. For each owner and operator further provide.**

a. The dates of their operation;

Response: Pharmacia owned and operated numerous facilities in the northeast region of the United States. Therefore, we have limited our review to facilities that operated from 1958 to the present within a 100 mile radius of the Site.

Camden Plant
1500 Pine Street
Camden, NJ 08103

Purchased by Pharmacia in 1935 from Swann Corporation. Pharmacia sold facility to Camdett Corporation on April 1, 1993.

Kearny Plant
Pennsylvania Avenue
Kearny, NJ 07032

Pharmacia began operation in September 1955. Facility was shut-down in 1991.

Kenilworth Plant
N. 8th Street & Monroe Avenue
Kenilworth, NJ 07033

Pharmacia began operation in 1939. Sold to INNOPAK Corporation in September 1987.

Yardville Plant
584 Route 130
Trenton, NJ 08691

Pharmacia purchased this facility in July of 1961 from Plax Corporation. Sold to Polychrome in February 1982.

Delaware River Plant
U.S. Route 130
Bridgeport, NJ 08014

Construction completed on facility in late 1961. Solutia sold to Ferro Corporation on August 21, 2000. Solutia retained ownership of certain units at Delaware River but it is operated by Ferro Corporation. That process is used to manufacture Tetrathal flame retardant.

b. The nature of their operation; and

Response:

Camden Plant: Produced natural and synthetic bone ash, lampblack, and Phos-Chek.

Kearny Plant: Produced phosphoric acid, sodium and potassium phosphates and surfactants.

Kenilworth Plant: Produced polyethylene film and sheet, and polyethylene bottles.

Yardville Plant: Produced blow-molded plastic containers.

Delaware River Plant: Produces organic phosphorus compounds, phthalic anhydride, benzyl chloride, plasticizers, muriatic acid, tetrachlorophthalic anhydride and solvents.

- c. All information or documents relating to the handling and/or generation, storage, treatment, recycling, formulation, disposal, or transportation of any hazardous substance, hazardous waste, pollutant, contaminant, or other waste during the period in which they were operating the establishment(s).**

Response: To be supplemented.

- 5. Describe the types of documents generated or maintained by your establishment(s) in the Philadelphia, Pennsylvania area concerning the handling and/or generation, storage, treatment, transportation, recycling, formulation, or disposal of any hazardous substance, hazardous waste, pollutant, contaminant or other waste between 1958 and 1976.**
- a. Provide a description of the information included in each type of document and identify the person who was/is the custodian of the documents;**
 - b. Describe any permits or permit applications and any correspondence between your company and/or establishment(s), and any regulatory agencies regarding the transportation and disposal of such wastes; and**
 - c. Describe any contracts or correspondence between your company and/or establishment(s) and any other company or entity regarding the transportation and disposal of such wastes.**

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Response: To be supplemented.

6. **Identify every hazardous substance used, generated, purchased, stored, or otherwise handled at your establishment(s) in the Philadelphia, Pennsylvania area between 1958 and 1976. Provide chemical analyses and Material Safety Data Sheets ("MSDS"). With respect to each such hazardous substance, further identify:**
- a. **The process(es) in which each hazardous substance was used, generated, purchased, stored, or otherwise handled;**
 - b. **The chemical composition, characteristics, and physical state (solid, liquid, or gas) of each such hazardous substance;**
 - c. **The annual quantity of each such hazardous substance used, generated, purchased, stored, or otherwise handled;**
 - d. **The beginning and ending dates of the period(s) during which such hazardous substance was used, generated, purchased, stored, or otherwise handled;**
 - e. **The types and sizes of containers in which these substances were transported and stored; and**
 - f. **The persons or companies that supplied each such hazardous substance to your company.**

Response: Solutia is not able to respond within the fifteen day time frame to the questions related to every hazardous substance in that question and its six subparts. As information and MSDS's are identified, they will be timely submitted to EPA.

7. **Identify all by-products and wastes generated, stored, transported, treated, disposed of, released, or otherwise handled by your establishment(s) in the Philadelphia, Pennsylvania area between 1958 and 1976. With respect to each such by-product and waste identified, further provide:**
- a. **The process(es) in which each such by-product and waste was generated, stored, transported, treated, disposed of, released, or otherwise handled;**
 - b. **The chemical composition, characteristics, and physical state (solid, liquid, or gas) of each such by-product or waste;**
 - c. **The annual quantities of each such by-product and waste generated, stored, transported, treated, disposed of, released, or otherwise handled;**

- d. The types, sizes, and numbers of containers used to treat, store, or dispose of each such by-product or waste;
- e. The name of the individual(s) and/or company(ies) that disposed of or treated each such by-product or waste; and
- f. The location and method of treatment and/or disposal of each such by-product or waste.

Response: To be supplemented.

8. **Did your company ever contract with, or make arrangements with Clearview, Folcroft, Folcroft Annex, Eastern Industrial, Tri-County Hauling, S. Buckley Trash Hauling, Barratt Rupert, McCloskey Engineering, Marvin Jonas, Jonas Waster (sic) Removal, Schiavo Bros., Inc., ADM Disposal Services and/or any other company or municipality to remove or transport material from your establishment(s) in the Philadelphia, Pennsylvania area between 1958 and 1976 for disposal? If so, for each transaction identified above, please identify:**

- a. **The person with whom you made such a contract or arrangement;**

Response: Records indicate that Marvin Jonas removed material from the Delaware River Plant. Our records do not reflect a contract or who made arrangements for the removal of material with Marvin Jonas.

- b. **The date(s) on which or time period during which such material was removed or transported for disposal;**

Response: Marvin Jonas removed material from the Delaware River Plant during the time period of 1974 to early 1978.

- c. **The nature of such material, including the chemical content, characteristics, and physical state (i.e., liquid, solid, or gas);**

Response: The material removed by Marvin Jonas at the Delaware River Plant was phthalic anhydride "heads" from a distillation process contained in drums. These "heads" consisted primarily of phthalic anhydride and acid with smaller amounts of benzoic acid and maleic anhydride. Once this material was placed in a drum it hardened like concrete, and could not be removed from the drum.

- d. **The annual quantity (number of loads, gallons, drums) of such material;**

Response: The years during which Marvin Jonas removed this material from the Delaware River Plant and the approximate volumes of the shipments are as follows:

ORIGINAL
10-71

| <u>Date</u> | <u>Quantity</u> |
|---------------|---|
| 1973 | 241 drums/13,255 gal./139,000 lbs. |
| 1974 | 218 drums/12,600 gal./109,000 lbs. |
| 1975 | 150 drums/9,460 gal./82,000 lbs. |
| 1976 | 141 drums/8,910 gal./77,000 lbs. |
| 1977 | 257 drums/15,897 gal./137,800 lbs. |
| 1978 | 88 drums/5,104 gal./50,380 lbs. |
| 1979 | No evidence of use of Jonas for disposal. |
| 1980 | No evidence of use of Jonas for disposal; Purchase of 15 new steel drums from Jonas Steel Drum Company by the Delaware River Plant. |
| <u>Total:</u> | 1095 drums/65,226 gal./595,180 lbs. |

e. The manner in which such material was containerized for shipment or disposal;

Response: The material was placed in drums.

f. The location to which such material was transported for disposal;

Response: Records indicate that this material was transported by Marvin Jonas and disposed of at landfills other than the Site.

g. The person(s) who selected the location to which such material was transported for disposal;

Response: Records do not indicate who selected the location to which such material was transported for disposal.

h. The individuals employed with any transporter identified (including truck drivers, dispatchers, managers, etc.) with whom your establishment dealt concerning removal or transportation of such material; and

Response: Records indicate that the following people were former truck drivers for Marvin Jonas:

William Louis Abington
Clarence Jefferson
David Bumbaugh

- i. **Any billing information and documents (invoices, trip tickets, manifests, etc.) in your possession regarding arrangements made to remove or transport such material**

Response: Attachment C is a copy of Marvin Jonas' 1973 through 1978 account receivable ledgers on Monsanto Chemical Company.

9. **Provide the names, titles, areas of responsibility, addresses, and telephone numbers of all persons who, between 1958 and 1976, may have:**
 - a. **Disposed of or treated materials at Clearview, Folcroft and Folcroft Annex or other areas of the Site:**
 - b. **Arranged for the disposal or treatment of materials at Clearview, Folcroft and Folcroft Annex or other areas of the Site; and/or**
 - c. **Arranged for the transportation of materials to Clearview, Folcroft and Folcroft Annex or other areas of the Site (either directly or through transshipment points) for disposal or treatment.**

Response: Solutia has no information responsive to question 9 and all of its subparts.

10. **For every instance in which your establishment(s) disposed of or treated material at Clearview, Folcroft and Folcroft Annex or other areas of the Site, or arranged for the disposal or treatment of material at the Site, Identify:**
 - a. **The date(s) on which such material was disposed of or treated at the Site:**
 - b. **The nature of such material, including the chemical content, characteristics, and physical state (i.e., liquid, solid, or gas);**
 - c. **The annual quantity (number of loads, gallons, drums) of such material;**
 - d. **The specific location on the Site where such material was disposed of or treated; and**
 - e. **Any billing information and documents (invoices, trip tickets, manifests, etc.) in your company's or establishment's(s') possession regarding arrangements made to dispose of or treat such material at the Site.**

Response: Solutia has no information responsive to question 10 and all of its subparts.

11. Did your establishment(s), or any other company or individual ever spill or cause a release of any chemicals, hazardous substances, and/or hazardous waste, and/or non-hazardous solid waste on any portion of Clearview, Folcroft and Folcroft Annex or any other portion of the Site? If so, identify the following:
- a. The date(s) of the spill(s)/release(s) occurred;
 - b. The composition (i.e., chemical analysis) of the materials which were spilled/released;
 - c. The response made by you or on your behalf with respect to the spill(s)/release(s); and
 - d. The packaging, transportation, and final disposition of the materials which were spilled, released.

Response: Solutia has no information responsive to question 11 and all of its subparts.

12. Please identify individuals employed by your establishment(s) who were responsible for arranging for the removal and disposal of wastes, and individuals who were responsible for payments, payment approvals, and record keeping concerning such waste removal transactions at your Philadelphia, Pennsylvania area establishment(s) between 1958 and 1976. Provide current or last known addresses and telephone numbers where they may be reached. If these individuals are the same persons identified by your answer to questions 3, so indicate.

Response: To be supplemented.

13. Did you or any person or entity on your behalf ever conduct any environmental assessments or investigations relating to contamination at Clearview, Folcroft and Folcroft Annex or any other areas of the Site? If so, please provide all documents pertaining to such assessments or investigations.

Response: Solutia has no knowledge of responsive information.

14. If you have any information about other parties who may have information which may assist the EPA in its investigation of the Site, including Clearview, Folcroft and Folcroft Annex, or who may be responsible for the generation of, transportation to, or release of contamination at the Site, please provide such information. The information you provide in response to this request should include the party's name, address, telephone number, type of business, and the reasons why you believe the party may have contributed to the contamination at the Site or may have information regarding the Site.

Response: To be supplemented.

15. Representative of your establishment(s):

- a. Identify the person(s) answering these questions on behalf of your establishment(s) including full name, mailing address, business telephone number, and relationship to the company.**

Response:

Brent J. Gilhousen (3S)
Solutia Inc.
Assistant General Counsel – Environmental
575 Maryville Centre Drive
St. Louis, MO 63141
(314) 674-8504

Sharon J. Williams (3S)
Solutia Inc.
Legal Assistant – Environmental
575 Maryville Centre Drive
St. Louis, MO 63141
(314) 674-5072

Shirley J. Schomburg (3S)
Solutia Inc.
Administrative Assistant – Environmental
575 Maryville Centre Drive
St. Louis, MO 63141
(314) 674-8505

- b. Provide the name, title, current address, and telephone number of the individual representing your establishment(s) to whom future correspondence or telephone calls should be directed.**

Response:

Brent J. Gilhousen (3S)
Solutia Inc.
Assistant General Counsel – Environmental
575 Maryville Centre Drive
St. Louis, MO 63141
(314) 674-8504

16. If any of the documents solicited in this information request are no longer available, please indicate the reason why they are no longer available. If the records were destroyed, provide us with the following:

- a. Your document retention policy;
- b. A description of how the records were/are destroyed (burned, archived, trashed, etc.) and the approximate date of destruction;
- c. A description of the type of information that would have been contained in the documents; and
- d. The name, job title, and most current address known to you of the person(s) who would have produced these documents, the person(s) who would have been responsible for the retention of these documents; and the person(s) who would have been responsible for the destruction of these documents.

Response: To be supplemented.

Monsanto

LAW DEPARTMENT

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63167
Phone: (314) 894-1000

May 28, 1987

VIA AIRBORNE

Lois A. Lauria
Environmental Protection Assistant
U.S. Environmental Protection Agency
Region III
CERCLA Removal Enforcement Section (3HW14)
841 Chestnut Building, 6th Floor
Philadelphia, PA 19107

Re: Tinicum Marsh/Folcroft Landfill, Folcroft, Pennsylvania

Dear Ms. Lauria:

As discussed during our telephone conversation of May 27, 1987 concerning the site referenced above, we are making a preliminary response to the U.S. Environmental Protection Agency's (U.S. EPA) letter dated May 8, 1987 even though we have not yet had an adequate opportunity to fully review our records in this matter. We must first note that we disagree with the U.S. EPA's overly broad assumption of authority which it asserts is conferred by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. Section 6901, et. seq., and the Resource Conservation and Recovery Act (RCRA). We also object to the overly broad scope of the questions included in the U.S. EPA's information request. However, consistent with Monsanto's policy of cooperation with government agencies, we are responding to your request, but at the same time not waiving any objections to U.S. EPA's statement of authority or the scope of information requested.

Based upon our review to date, we can provide the following responses to the information requests contained in U.S. EPA's May 8, 1987 letter. We anticipate that we will be able to supplement this response by July 1, 1987 with any additional

information derived from our further reviews. As for the nature of this company's business, Monsanto primarily manufactures, refines and processes a variety of industrial, commercial and consumer chemical products. We have no information of having sent any type or quantity of hazardous substances to the Folcroft Landfill and Landfill Annex. As a result, questions concerning dates of shipment, physical states, manner of disposal, and correspondence with regulatory agencies or third parties, are not applicable. Furthermore, we have no information on the identity of any other person who may have been involved with hazardous substances at the Folcroft Landfill and Landfill Annex. Similarly, we have no documents relating to any real interests in these sites. Finally, we have no correspondence between ourselves and any regulatory agency or third party regarding the Folcroft Landfill or Folcroft Annex.

As for any insurance against releases of hazardous wastes or substances, Monsanto Company had, and does have, various insurance policies with coverages which vary over the past thirty years. If Monsanto is ever adjudged liable for costs arising from disposal of waste materials, Monsanto and its insurance carriers will determine whether or not certain policies provide coverage for the specific occurrences which led to the liability.

While Monsanto is presently continuing to search its records for further information on the sites, it is noted that the U.S. EPA's information request on these sites is extremely broad and apparently relates to a period of time some 15 to 25 years ago (1960-1973). Given the age of the transactions and the scope of the information in which EPA is interested, Monsanto cannot fully respond to the U.S. EPA's request without the corresponding assistance of the U.S. EPA. Accordingly, we request that U.S. EPA provide us with all data in its possession which reflects any involvement of Monsanto with the sites referenced above. Unless U.S. EPA can shed some light upon the alleged involvement, the accuracy of our response to the U.S. EPA's information request will suffer.

In general, please be assured that Monsanto supports the prompt, efficient cleanup of sites which present an imminent and substantial danger to human health, welfare and the environment. In the event there is evidence that Monsanto is responsible for hazardous substances at the site referenced above, Monsanto is prepared to participate with other potentially responsible parties in cleanup efforts, based upon an appropriate apportionment of responsibility among all the parties. Accordingly, consistent with our request for information above, please provide Monsanto with any information which leads the U.S. EPA to believe that Monsanto is liable for cleanup costs at these sites.

If you have any questions concerning information supplied by Monsanto herein, or our request for information from U.S. EPA, please call me at 314/694-1278.

Very truly yours,

A handwritten signature in cursive script, reading "Stephen Krchma".

Stephen P. Krchma
Environmental Attorney

ehEL213/17

Monsanto

LAW DEPARTMENT

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63167
Phone: (314) 694-1000

July 1, 1987

Lois A. Lauria
Environmental Protection Assistant
U.S. Environmental Protection Agency
Region III
CERCLA Removal Enforcement Section (3HW14)
841 Chestnut Building, 6th Floor
Philadelphia, PA 19107

Re: Tinicum Marsh/Folcroft Landfill, Folcroft, Pennsylvania

Dear Ms. Lauria:

In our previous letter, dated May 28, 1987, on this subject, we advised you that we would complete the review of our records on this matter by July 1, 1987 and advise you of any additional information derived from that review. We have now completed our review and have found no additional information which indicates that any materials generated by Monsanto were disposed of at the Tinicum Marsh/Folcroft Landfill site.

As indicated in our earlier correspondence, the time period and scope of information sought is such that Monsanto's response to the U.S. EPA's information request requires the corresponding assistance of the U.S. EPA. We therefore requested that the U.S. EPA provide us with all data which reflects any involvement of Monsanto with the Tinicum Marsh/Folcroft Landfill site. We have not yet received a response to this request.

Once we have had an opportunity to review any information which the U.S. EPA has concerning Monsanto's alleged involvement, we may be in a position to further supplement our response. In the meanwhile, if you have any questions concerning Monsanto's position in this matter, please call me.

Very truly yours,



Stephen P. Krchma
Environmental Attorney

ehEL214/12

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NAME
ADDRESS
CITY

MONSANTO CHEMICAL CO.
Rt. #130
Bridgeport, N.J. 08014

WASTE

ORIGINAL
(10-80)

BALANCE FORWARD →

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| 2 | 6-29 | R122 | 3191 | 1 | | 351 - | - - | 351 - |
| 3 | 11-12 | A ³⁰ 29 | 4651 | 2 | 342 - | | 342 - | |
| 4 | 12/19 | R35 | 4651 | 2 | | 342 - | - - | 342 - |
| 5 | 4/2 | A17 | 4043 | 3 | 371 50 | | 371 50 | |
| 6 | 4/24 | R18 | 4043 | 3 | | 371 50 | - - | 371 50 |
| 7 | 6/17 | A29 | 5767 | 4 | 575 - | | 575 - | |
| 8 | 8-29 | A40 | 5474 | 5 | 468 - | | 1043 - | 575 - |
| 9 | 9-23 | R37 | 5167 | 4 | | 575 - | 468 - | 1043 - |
| 10 | 9-23 | R37 | 5474 | 5 | | 468 - | - - | 468 - |
| 11 | 11/4/75 | A1 | 5915 | 6 | 585 - | | 585 - | |
| 12 | 1-24 | R3 | 5915 | 6 | | 585 - | - - | 585 - |
| 13 | 6-11 | A25 | 6549 | 7 | 585 - | | 585 - | |
| 14 | 7/17 | R26 | 6549 | 7 | | 585 - | - - | 585 - |
| 15 | 11/15 | A45 | 7144 | 8 | 533 00 | | 533 00 | |
| 16 | 12/5 | R40 | 7144 | 8 | | 533 00 | - - | 533 00 |
| 17 | 6/7/76 | S-74 | 7951 | 9 | 520 00 | | 520 00 | |
| 18 | 6/25 | R64 | 7951 | 9 | | 520 00 | - 0 - | 520 00 |
| 19 | 8/31 | S-86 | 8311 | 10 | 520 00 | | 520 00 | - 0 - |
| 20 | 9/17 | R-73 | 8311 | 10 | | 520 00 | - 0 - | 520 00 |
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| 22 | 1/17/77 | S-4 | 131 | 11 | 663 00 | | 663 00 | - 0 - |
| 23 | 2/1/77 | R3 | 131 | 11 | | 663 00 | - 0 - | 663 00 |
| 24 | 6/27 | S32 | 900 | | 748 00 | | 748 00 | - 0 - |
| 25 | 7/22 | R-23 | 900 | | | 748 00 | - 0 - | 748 00 |

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NAME **Monsanto Chem. Co.**
 ADDRESS
 CITY

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| 1978 | | | | BALANCE FORWARD → | | - 0 - | |
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| DATE | FOLIO | DETAIL | ✓ | DEBIT | CREDIT | BALANCE | PREVIOUS BALANCE |
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| 1/27 | R.3 | 1819 | ✓ | | 880 00 | - 0 - | 880 00 |
| 4/17 | S-18 | 2279 | ✓ | 1584 00 | | 1584 00 | - 0 - |
| 5/6 | R.16 | 2279 | ✓ | | 1584 00 | - 0 - | 1584 00 |
| 11/6 | S-11 | 8403 | ✓ | 396 00 | TRANSF- | 396 00 | - 0 - |
| 11/30 | R.44 | 8403 | ✓ | | 396 00 | 396 00 | - 0 - |
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Monsanto Chem.

Bridgeport
(N.J.)

Date ~~Cont.~~
4/17 88dr

Gallons
61400

Material
21 3/4
drums

Disposal Site
gravel

✓ 22 ✓

U.S.P.O.W.S.

4402

2/32 2560

Mobil
5.24/4

L OIL
21 3/4
drums

Truckhouse

✓ 22 ✓

Kennelhooker - 21-71

21-71

52-

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

NAME
ADDRESS
CITY

Time "M"

BALANCE FORWARD →

3931.00

| | DATE | FOLIO | DETAIL | DEBIT | CREDIT | BALANCE | PREVIOUS BALANCE |
|----|-------|-------|-------------------------|---------|---------|---------|------------------|
| 1 | 9/9/ | R.30 | 1067-692 | | 1262 00 | 2672 00 | 2672 00 |
| 2 | 9/12 | S.47 | 1268 ^{MATROCK} | 800 00 | | 3472 00 | 2672 00 |
| 3 | 9/12 | S.47 | 1269 ^{MATROCK} | 910 00 | | 4382 00 | 2672 00 |
| 4 | 9/19 | S.48 | 1321 ^{MATROCK} | 630 00 | | 5012 00 | 2672 00 |
| 5 | 9/23 | R.31 | 1130 ^{MATROCK} | | 850 00 | 4162 00 | 2672 00 |
| 6 | 9/30 | R.32 | 1269 ^{MATROCK} | | 910 00 | 3252 00 | 2672 00 |
| 7 | 9/30 | S.52 | 1402 ^{MATROCK} | 850 00 | | 4102 00 | 2672 00 |
| 8 | 10/14 | R.34 | 1187 | | 932 00 | 3170 00 | 2672 00 |
| 9 | 10/21 | R.34 | 1129 | | 890 00 | 2280 00 | 2672 00 |
| 10 | 10/24 | S.54 | 1492 ^{MATROCK} | 934 00 | | 3214 00 | 2672 00 |
| 11 | 10/28 | R.35 | 1268 ^{MATROCK} | | 800 00 | 2414 00 | 2672 00 |
| 12 | 10/31 | S.56 | 1524 ^{MATROCK} | 2096 00 | | 4510 00 | 2672 00 |
| 13 | 11/4 | R.36 | 1321 | | 630 00 | 3880 00 | 2672 00 |
| 14 | 11/7 | S.58 | 1568 ^{MATROCK} | 1864 00 | | 5744 00 | 2672 00 |
| 15 | 11/10 | R.37 | 1402 | | 850 00 | 4894 00 | 2672 00 |
| 16 | 11/29 | S.61 | 1652 | 300 00 | | 5194 00 | 2672 00 |
| 17 | 12/2 | R.40 | 1492 | | 934 00 | 4260 00 | 2672 00 |
| 18 | 11/30 | S.61 | 1672 | 600 00 | | 4860 00 | 2672 00 |
| 19 | 12/9 | R.41 | 1524 | | 2096 00 | 2764 00 | 2672 00 |
| 20 | 12/12 | R.41 | 1568 | | 1864 00 | 900 00 | 2672 00 |
| 21 | 12/12 | S.63 | 1735 | 300 00 | | 1200 00 | 2672 00 |
| 22 | 12/12 | S.63 | 1714 | 600 00 | | 1800 00 | 2672 00 |
| 23 | 12/19 | S.64 | 1757 | 300 00 | | 2100 00 | 2672 00 |
| 24 | 12/19 | S.64 | 1758 | 600 00 | | 2700 00 | 2672 00 |
| 25 | 12/27 | S.65 | 1784 | 982 00 | | 3682 00 | 2672 00 |

A

Monsanto

AUG 24 1983 File

CAMDEN - RC

FROM
(NAME-LOCATION-PHONE)

R. P. Panasiewicz - Camden 1150

DATE

August 24, 1983

cc.

D. C. Dieterich - Camden 1150
S. L. Cooper - G3WB (Att.)

SUBJECT

CAMDEN PLANT

WASTE DISPOSAL 1/1/75 - 1/1/78

REFERENCE

TO

M. R. Foresman
St. Louis B3NA

The following table lists disposal facilities, dates and type of waste removed from the Camden Plant between 1/1/75 and 1/1/78.

| <u>Disposal Facility</u> | <u>State Location</u> | <u>Dates</u> | <u>Type of Waste</u> |
|--------------------------|-----------------------|--------------|----------------------|
| Prickett's Industrial | Deptford, NJ | 1975-78 | Water sludge, |
| Tank Cleaning Corp. | | | commercial |
| (PITCCO) | | | fuel, oils, |
| | | | and petro- |
| | | | leum distilates. |

Attached are invoices from PITCCO covering this period.

This is the only hazardous waste disposed of during this time frame. Should you need additional information, please contact me.


R. P. Panasiewicz

RPP:ms
Atts.

MCO 6466709

INVOICE

INVOICE 2324
NO.

INVOICE
DATE 2/14/75

SHIPPED
TO

SOLD
TO

Monsanto Co. 5352254
Purchasing Dept.
1500 Pine St.
Camden, N.J.

P.O. K-2009-K

Net 10 days

| ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. | |
|-----------------------------|--|----------|-------|-------------|---------------|--------|
| QUANTITY | DESCRIPTION | | | | PRICE | AMOUNT |
| | Supplied labor and equipment to pump out and dispose of 6 inches of sludge in #1 tank, squeezed floors and sides of tank to height of six feet. Supplied air box and masks, breathing apparatus for entry into tank. | | | | | |
| | Outback oil LX-830 | | | | | |
| | All sludge removed from the premises..... | | | | 750.00 | |
| | N.J. 5% Tax..... | | | | 37.50 | |
| | | | | | 787.50 | 787.50 |
| Rec'd Pay 3/7/75 ch# 330656 | | | | | | |

BUSINESS ENVELOPE MFGS. INC.
BRONX, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PR103-2

MCO 6466710

INVOICE

INVOICE NO. 2326

INVOICE DATE 2/21/75

SHIPPED TO

SOLD TO Monsanto Co.
Purchasing Department
1500 Pine Street
Camden, N.J. 08103

P.O.# K-1971-M

Net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. | |
|---------------------------------|--|----------|-------|-------------|---------------|---------|
| QUANTITY | DESCRIPTION | | | | PRICE | AMOUNT |
| | Supplied labor and equipment to clean 200,000 gallon #2 fuel storage tank. | | | | | |
| | Insurance certificates and gas free certificates issued..... | | | | 1425.00 | |
| | N.J. 5% Tax..... | | | | 71.25 | |
| | | | | | 1496.25 | 1496.25 |
| Rec'd Pay 3/18/75 CK# 01-332098 | | | | | | |



BUSINESS ENVELOPE NPRS. INC.
BRONX, N. Y. 10451
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK1033

MCO 6466711

SHIPPED TO Same

SOLD TO Monsanto Chemical Company
1500 Pine Street
Camden, New Jersey 08103

P.O. K 2254 H

Net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR G |
|-------------------|---|----------|-------|-------------|-----------|
| QUANTITY | DESCRIPTION | | | PRICE | AMOUNT |
| 4/21 & 4/22 | Cleaning of Caril City Tank..7500 gal.capacity Supplied standby truck and hooked up three (3) suction and two (2) return lines for service to burners. Supplied labor to disconnect and pull out manhead with coil in it. Disconnected unions on lines (5) in head and replaced same. Steam cleaned all lines, and vent free of accumulated sludge. Entered into the tank and cleaned down thoroughly. New bolts and new gasket installed at manhead for tight seal. All good oil from standby truck pumped back into the cleaned tank. All sludge removed from the premises..... | | | \$750.00 | |
| 4/22 | <u>Cleaning of Tank 2C storage tank.</u> Pumped out all contents of tank, entered into the tank and cleaned down thoroughly. All sludge removed from the premises..... | | | \$300.00 | |
| | | | | \$1050.00 | |
| | N.J. Tax..5%..... | | | 52.50 | |
| | | | | \$1102.50 | |

Rec'd Payment 5/20/75

BUSINESS ENVELOPE MFRS. INC.
BRONX, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK103-3

MCO 6466712

NEW YORK, NEW YORK, N.Y. 10001

INVOICE

INVOICE NO. #2363

INVOICE DATE May 9, 1975

SHIPPED TO Same

Monsanto Chemical Company
SOLD 1500 Pine Street
TO Camden, N.J. 08103

K23162

Attention: Lou Graff

Net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. | |
|----------------------|---|----------|-------|-------------|--|----------|
| QUANTITY | DESCRIPTION | | | | PRICE | AMOUNT |
| 5/6 | Supplied labor and equipment to pump off water in big tank to reach oil level. Bottom pumped out tank of water and pumped out 22 drums (55 gallon each) of sludge oils and hauled to approved disposal area. Vacuum unit, operator and helper..5 hrs. @ \$50.00 per hr. Dumping charge for disposal of 5000 gallon of oil and sludge @ 4¢ per gallon..... 12 jars of Water finder @ 1.90 per jar..... N.J. 5% Tax..... | | | | \$250.00 200.00 22.80 \$472.80 23.64 | \$496.44 |
| Rec'd Payment 6/6/75 | | | | | | |

Rec'd Payment 6/6/75

b BUSINESS ENVELOPE MFG. INC.
BRONX, N. Y. 10451
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PR105-2

MCO 6466713

INVOICE

INVOICE NO. #2410

INVOICE DATE July 21, 1975

SHIPPED TO Same

SOLD TO Monsanto Company
1500 Pine Street
Camden, New Jersey 08103

P.O. K 2502 L

Net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. |
|-----------------------------|--|----------|-------|-------------|-----------------|
| QUANTITY | DESCRIPTION | | | PRICE | AMOUNT |
| | Supplied labor and equipment to pump out water out of B.A. Oil tank. | | | | |
| | Vacuum unit, operator and helper. Three (3) hrs @50.00..... | | | | \$150.00 |
| | Dumping charge for disposal of 1/2 truck load..... | | | | 100.00 |
| | Purchased and delivered one (1) 4" fill cap..... | | | | 34.50 |
| | | | | | <u>\$284.50</u> |
| | 5% Tax of N.J. | | | | <u>14.23</u> |
| | | | | | <u>\$298.73</u> |
| <i>Rec'd Payment 8/8/75</i> | | | | | |



BUSINESS ENVELOPE MFG. CO.
BROOK, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK105-3

MCO 6466714

INVOICE

INVOICE NO. #2424

INVOICE DATE August 8, 1975

SHIPPED TO Same

SOLD TO Monsanto Company
1500 Pine Street
Camden, New Jersey 08103

Att: Lou Graff

Net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. |
|---------------|--|----------|-------|-------------|---------------|
| QUANTITY | DESCRIPTION | | | PRICE | AMOUNT |
| 8/1/75 | Friday 5 PM to 1 AM8 hours @50.00 per hr..... | | | \$400.00 | |
| | N.J. % Tax..... | | | 20.00 | |
| | | | | \$420.00 | |
| | Supplied labor and equipment to pump off gas oil from tank as instructed by Lou Graff. | | | | |
| | Rec'd Payment 9/2/75 | | | | |



BUSINESS ENVELOPE MFG. CO.
BROWN, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK103-3

MCO 6466715

INVOICE

INVOICE #2471
NO.

INVOICE DATE October 20, 1975

SHIPPED TO Sale

SOLD TO
Monsanto Company
1500 Pine Street
Camden, New Jersey 08103


P.O. K2793L

Net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. | |
|---------------|--|----------|-------|-------------|---------------|--------|
| QUANTITY | DESCRIPTION | | | | PRICE | AMOUNT |
| 10/16 | Supplied vacuum unit and operator and helper to pump out 32 drums of waste oils and hauled to approved disposal area for disposal. | | | | | |
| | Vacuum unit, operator and helper..4 hrs @ \$50.00 per hr. | | | | \$200.00 | |
| | Charge for 1/2 load hauled to disposal area..... | | | | 100.00 | |
| | | | | | \$300.00 | |
| | N.J. 5% Tax..... | | | | 15.00 | |
| | | | | | \$315.00 | |

Rec'd Pay 11/7/75 ck 01380353

Rec'd Pay 11/7/75 ck 01380352

 BUSINESS ENVELOPE MFRS. INC.
BRONX, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK102-3

MCO 6466716

INVOICE

INVOICE # 2496
NO.

INVOICE DATE December 5, 1975

SHIPPED TO Same yard-
10,000 gal #4 fuel t

SOLD TO Monsanto Co. Inc.
1500 Pine Street
Camden, New Jersey 08103

Att: Lou Graff

K-2493-L

Net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. | |
|-----------------------|---|----------|-------|-------------|---------------|--------|
| QUANTITY | DESCRIPTION | | | | PRICE | AMOUNT |
| 12/1/75 | Supplied labor and equipment to open up the manhead, pump out all oil, water and sludge, enter into the tank and clean thoroughly for inspection. New bolts and new gasket installed at manhead for tight seal..... | | | | \$450.00 | |
| 12/3/75 | Supplied labor and equipment to weld head in tank.... | | | | 125.00 | |
| 12/4/75 | Supplied labor and equipment to break concrete around fill box and installed new fill box and recemented same. (Note: Fillbox supplied by Monsanto) | | | | | |
| | Welded socket in head for suction line..... | | | | 75.00 | |
| | | | | | \$650.00 | |
| | N.J. 5% Tax..... | | | | 32.50 | |
| | | | | | \$682.50 | |
| Rec'd Payment 3/22/76 | | | | | | |

Rec'd Payment 3/22/76



BUSINESS ENVELOPE MFG. CO. INC.
BRONX, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PR100-2

MCO 6466717

INVOICE

INVOICE #2520
NO.

INVOICE DATE January 10, 1976

SHIPPED TO Same

SOLD TO Monsanto Company
1500 Pine Street
Camden, New Jersey 08103

Attn: Lou Graff

net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. |
|-----------------------|---|----------|-------|------------------|---------------|
| QUANTITY | DESCRIPTION | | | PRICE | AMOUNT |
| | Cleaning of 150,000 gallon low flash point oil tank. Pumped out all contents, entered into the tank and washed down and squeegeed down clean. All contents and wash water removed from premises and hauled to approved disposal area..... | | | \$1500.00 | |
| | N.J. 2% Tax..... | | | 75.00 | |
| | | | | <u>\$1575.00</u> | |
| Rec'd Payment 1/29/76 | | | | | |



BUSINESS ENVELOPE MFGS. INC.
BRONS, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK102-2

MCO 6466718

INVOICE

INVOICE NO. #2521

INVOICE DATE January 13, 1976

SHIPPED TO Same

ORIGINAL (Red)

SOLD Monsanto Company
TO 1500 Pine Street
Camden, New Jersey 08103

Att: Lou Graff

net 10 days

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PFD. OR COLL. |
|-----------------------|--|----------|-------|---|---------------|
| QUANTITY | DESCRIPTION | | | PRICE | AMOUNT |
| 1/12 | Supplied labor and equipment to pump out contents of tank as directed. Vacuum unit, operator and helper. 7:30 Am to 10:AM= 2-1/2 hrs @ \$50.00 per hr..... 700 gallon hauled to approved disposal area @ 4¢ per N.J 5% tax..... Tax.... | | | \$125.00 28.00 \$153.00 7.65 \$160.65 | |
| Rec'd Payment 1/29/76 | | | | | |



BUSINESS ENVELOPE MFG. INC.
BRONX, N. Y. 10451
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK103-3

MCO 6466719

NEW JERSEY OFFICE

INVOICE

INVOICE NO. #2532

INVOICE DATE January 30, 1976

SHIPPED TO Same

SOLD TO Monsanto Company
1500 Pine Street
Camden, New Jersey 08103

Att: Lou Graff

K-3154-L

net 10 days

| YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. |
|----------------|----------|-------|-------------|---------------|
|----------------|----------|-------|-------------|---------------|

| QUANTITY | DESCRIPTION | PRICE | AMOUNT |
|-----------------------|--|-------|----------------------------------|
| 1/27 | Supplied labor and equipment (vacuum unit) to pump out app. 6 ft of water and sludge from sump pit. Vacuum unit, operator and helper.. 1:30 PM to 5 PM = 3-1/2 hrs Hauled 4000 gallon to approved disposal area @ 4¢ per | | \$160.00 |
| 1/28 | Finished pumping out sump pit and pumped out drums of waste oil (32 drums) Vacuum unit, operator and helper.. 12 noon to 5 PM = 3 hrs. A total of 6-1/2 hrs. @ 50.00 per hr..... 3000 gallon hauled to approved disposal area @ 4¢ per..... | | \$325.00 \$120.00 \$605.00 |
| | N.J. 5% tax..... | | 30.25 \$635.25 |
| Rec'd Payment 2/27/76 | | | |

BUSINESS ENVELOPE MFG. INC.
BRONX, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK103-3

MCO 6466720

INVOICE

INVOICE
NO. #2586

INVOICE
DATE April 19, 1976

SHIPPED
TO Same

Monsanto Co.
SOLD TO 1500 Pine Street
Calden, New Jersey 08103

P.O. K-3365-L

net 10 days

| | | | | | |
|-----------------------|---|----------|-------|-----------------|---------------|
| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. |
| QUANTITY | DESCRIPTION | | | PRICE | AMOUNT |
| | Provided service and material and cleaned both oil sump pits and disposed of oil residue in drums..... | | | \$500.00 | |
| | Disposal of 2000 gallon of oil, water and sludge @ 4¢ per | | | 80.00 | |
| | | | | <u>\$580.00</u> | |
| | N.J. 5% Tax..... | | | 29.00 | |
| | | | | <u>\$609.00</u> | |
| Rec'd Payment 5/12/76 | | | | | |



BUSINESS ENVELOPE MFRS. INC.
BRONX, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK105-3

MCO 6466721

INVOICE

INVOICE
NO. 2948


INVOICE
DATE 7/18/77

SHIPPED
TO

Monsanto Co.
SOLD 1500 Pine St.
TO Camden, N.J. 08103

Att: Lou Graff

| | | | | | | |
|---|--|----------|-------------|-------------|-------------------------------|----------|
| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS | SHIPPED VIA | PPD. OR COLL. | |
| | | | Net 10 Days | | | |
| QUANTITY | DESCRIPTION | | | | PRICE | AMOUNT |
| 5/77 | Supplied labor to remove and replace coil, cleaned out tank and hauled sludge to disposal area. Vacuum unit, operator and helper 7am to 3pm= 2 hours 8 hours @ \$50.00 per hour..... N.J. 5% Tax..... | | | | \$400.00 20.00 \$420.00 | \$420.00 |
| <div>RECEIVED PAYMENT 8/9/77 ck no 03-212620 for 420.00</div> | | | | | | |

 BUSINESS ENVELOPE MFRS. INC.
BRONS, N. Y. ENOSVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK103-3

MCO 6466722

INVOICE

INVOICE
NO.

3097

INVOICE
DATE

12/12/77

SHIPPED
TO

SOLD
TO

Monsanto Co.
1500 Pine St.
Camden, N.J. 08103

P.O. # K-5517-L

| OUR ORDER NO. | YOUR ORDER NO. | SALESMAN | TERMS Net 10 Days | SHIPPED VIA | PPS. OR COLL. |
|--------------------|---|----------|----------------------|-------------------|---------------|
| QUANTITY | DESCRIPTION | | | PRICE | AMOUNT |
| 12/5/77 12/6/77 | Service provided to pump out oil spill from three (3) house tank dike (was performed twice) Four (4) hours Three (3) hours 7 hours @ \$50.00 per hour..... | | | \$350.00 | |
| | Hauled 1000 gallons of sludge to approved disposal area @ 8¢ per gallon..... | | | 80.00 | |
| | N.J. 5% Tax..... | | | \$430.00 21.50 | |
| | | | | \$451.50 | \$451.50 |

RECEIVED
PAYMENT
12/29/77
CK # 03-225302
for \$451.00



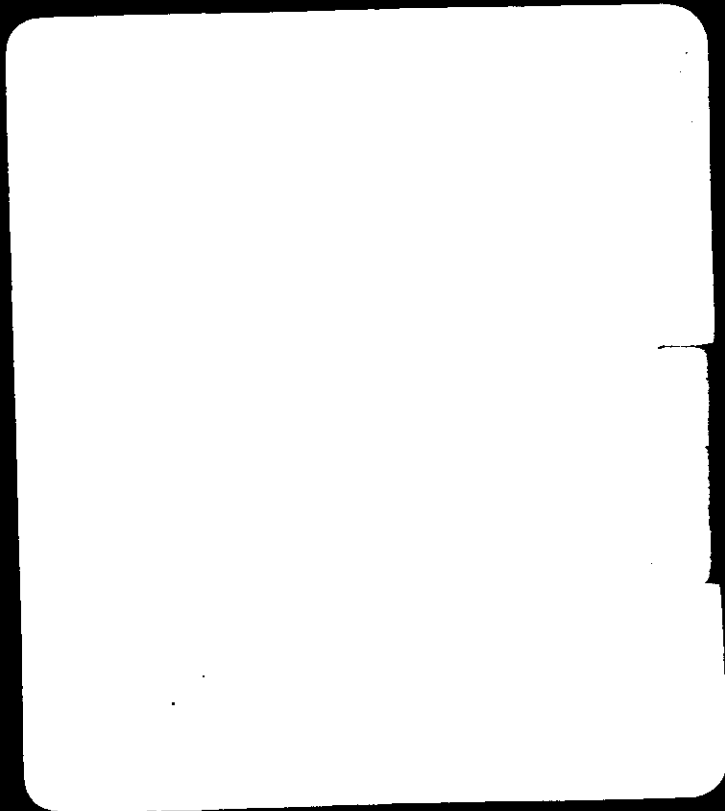
BUSINESS ENVELOPE MFGS. INC.
BRONX, N. Y. KNOXVILLE, TENN.
MELROSE PARK, ILL.
ANAHEIM, CALIF.
PK103-3

MCO 6466723

1

B

6.7



MCO 5358860

ZERO DISCHARGE
AT THE
DELAWARE RIVER PLANT

MARCH, 1976

Prepared by:

M. A. Pierle
M. A. Pierle

E. D. Clemons
E. D. Clemons

J. F. Quinn
J. F. Quinn

MCO 5358861

TABLE OF CONTENTS

| | <u>Page No.</u> |
|------------------------------|-----------------|
| I. INTRODUCTION | 1 |
| A. Problem | 1 |
| B. Purpose | 1 |
| C. Scope | 1 |
| D. Limiting Assumptions | 2 |
| II. CONCLUSIONS | 3 |
| III. RECOMMENDATIONS | 4 |
| IV. SUMMARY | 5 |
| Results | 5 |
| Treatment Technology | 5 |
| Treatment Costs | 6 |
| V. DETAILS | 9 |
| A. Site Selection Rationale | 9 |
| B. Technology | 9 |
| C. Flow Diagrams | 22 |
| D. Cost Estimates | 30 |
| E. Energy Utilization | 45 |
| VI. APPENDIX | 46 |
| Definition of Zero Discharge | |
| VII. REFERENCES | 48 |

I. INTRODUCTION

A. Problem

Regulations under the Federal Water Pollution Control Act Amendments of 1972 (the Act) require increasingly stringent control on discharge from industrial operations. These controls culminate with a 1985 national goal that "the discharge of pollutants into the navigable waters be eliminated". Monsanto has not conducted a study to determine the feasibility of meeting this goal at any one plant nor does it have a data base to justify a company position as to the overall feasibility of the national goal.

B. Purpose

This study was undertaken to determine if zero discharge from a manufacturing location is both technically and economically feasible. The study was to be conducted, if possible, such that techniques developed could be applied to other plants. The study results could then serve as a basis for formulating and defending a Company position against extremely stringent regulations.

C. Scope

The initial study was limited to the Delaware River plant, its manufacturing operations in existence as of 1974 at current production rates, and its associated support facilities.

The general plan consisted of:

1. determining existing department and plant discharges, utilizing available plant pollution group monitoring data and TSD's current process material balances;
2. developing by Research, paper processes for achieving in-department zero discharge;
3. determining what, if any, additional end-of-pipe waste treatment facilities would be necessary;
4. estimating capital and operating costs for treatment schemes proposed in (2) and (3), and
5. preparing comparison of alternate cases for meeting zero discharge.

Three zero discharge cases were developed:

- Case 1. No in-department treatment with end-of-pipe treatment consisting of activated carbon and solids incineration.

Case 2. Maximum in-department treatment for each process with minimum end-of-pipe treatment of residuals.

Case 3. In-department treatment for manufacturing processes where treatment processes were defined and end-of-pipe treatment for residuals.

D. Limiting Assumptions

It was necessary at the inception of this study to limit its scope. This was done by imposing the following limits on the work to be done.

1. All treatment facilities will be designed and costed on waste streams discharged from 1974 existing facilities at 1974 production rates (includes production and support services).
2. Where products are made on a campaign basis (e.g. Santicizers 160, 261, 278), the effluents from the major product produced were used to define treatment needs. The blend department was assumed to be a zero polluter.
3. No process research would be undertaken to validate proposed "paper" processes.
4. Zero discharge was defined to allow discharges of:
 - a) inorganic ions compatible with the saline waters of the Delaware River,
 - b) pollutants in amounts not to exceed those in the plant well water supply.
5. Air pollution will be decreased by the treatment processes.
6. Only inert solid wastes will be acceptable to landfill disposal.
7. Water usage reduction was not a primary objective.
8. Liquid residues will be sold or incinerated by local contractors.

MCO 5358864

II. CONCLUSIONS

1. Technology to achieve "zero pollution" at the Delaware River plant is not presently available.
 - a) Where technology for in-department treatment is highly defined, it still does not meet "zero discharge" definition.
 - b) Final effluent quality for organic pollutants approaches "zero discharge" only on the assumption that activated carbon will remove all organic materials.
2. An optimum cost system for approaching zero discharge would consist of some in-department treatment and end-of-pipe treatment of the residuals (Case 3).
3. Zero discharge is not economically feasible.
 - a) For the Delaware River plant achieving zero discharge in 1983 would approximately double the capital investment at the site.
 - b) Plant income in 1975 would have been decreased by \$4-5M had "zero discharge" been an existing requirement.

Since "zero discharge" did not contemplate total inorganic pollutant removal and total water recycle, this conclusion is very conservative.
4. There were no potential cost savings projects identified as a result of this study.
5. The high cost of add on treatment technology to approach zero discharge highlights the need to emphasize pollution control requirements during early stages of process development.
6. Utilization of current plant effluent monitoring and process material balance data provided an adequate base for this study.
7. Energy consumption would increase markedly over 1975 actual plant wages.
 - a) Electrical usage would increase from 2.5 to 10%.
 - b) Fuel oil usage would increase from 40 to 70%.

IV. SUMMARY

Results

Treatment Technology

In-department treatment technology was developed for each manufacturing unit. The technologies for phthalic anhydride and phosphate esters (S-141 and S-148) pollution control are actually well defined. Incineration of all phthalic anhydride wastes is proven, practiced technology for naphthalene-based plants. Solvent extraction of phosphate ester wastes with phenol recovery and residue incineration is practiced on similar products at the J. F. Queeny plant. A project to install a system at Delaware River had advanced through the Project Definition Report phase within CED. Treatment technologies for the remaining production units are not defined with essential little or no supporting research work conducted. Therefore, success of the proposed schemes is accompanied by a high risk.

Activated carbon was assumed to be the next step in end-of-pipe treatment of liquid wastes. This system would follow the existing biological waste treatment plant. Also included as a part of the waste treatment system was a plant incinerator capable of handling solid residues generated from in-department and end-of-pipe treatment processes. It was assumed that liquid residues from S-160/BzCl would continue to be sold and those from S-141/148 would be disposed by contract incineration.

Treatment of the high chromium content tempered water system used in the phthalic anhydride department was considered to be a site support project. Treatment technology is reasonably well defined.

Treatment of cooling tower blowdowns was deemed unnecessary. This is based on the assumption that non-chromate, non-zinc corrosion prevention chemicals would be available as replacements to the existing chrome and/or zinc based compounds presently employed.

Based on these, in-department treatment technologies on effluent quality to the end-of-pipe treatment system could be calculated. These values and the percentage reduction from untreated waste loads are given in Table 1. Also given are the final discharge values following end-of-pipe treatment and total system percentage reductions.

III. RECOMMENDATIONS

1. This study should be utilized to support a Company position that "zero discharge" is not technically or economically feasible.
2. Environmental control research reviews should be continued with even added emphasis to develop "zero discharge" processes.
3. Extrapolation of unit treatment costs developed in this study to other plants should be restricted to plants that have primarily organic pollutants in their waste water.
4. Any studies similar to this should not be undertaken unless the base effluent monitoring and process material balance data are current.

MCO 5358867

Table 1

| Effluent Quality & Reduction Efficiencies | | | | | | | | | | | | | |
|---|-----------|---------------------------------------|------|------|--------|----|----|-------------------------------------|------|------|--------|------|------|
| Pollutant | Untreated | Effluent from In-department Treatment | | | | | | Effluent from End-of-Pipe Treatment | | | | | |
| | lbs/hr | lbs/hr | | | % Red. | | | lbs/hr | | | % Red. | | |
| Case* | 1, 2, 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Organics | 2017 | 2017 | 150 | 1000 | 0 | 93 | 50 | 6 | 6 | 6 | 99.7 | 99.7 | 99.7 |
| Inorganics | 6792 | 6792 | 2052 | 6792 | 0 | 70 | 0 | 6792 | 2052 | 6792 | 0 | 70 | 0 |
| Flow ⁽¹⁾ | 1.5 | 1.5 | 0.8 | 1.0 | 0 | 47 | 33 | 1.5 | 0.8 | 1.0 | 0 | 47 | 33 |

(1) Units-million gallons per day

* Case Definition

1 = no in-department treatment

2 = max. in-department treatment

3 = limited in-department treatment

Treatment Costs

Based on the technology inputs, it was decided to develop cost estimates for three cases as previously indicated in the Scope section.

Since the in-department technologies for phthalic anhydride and phosphate esters were highly developed, it was decided that the case between the extremes of no in-department treatment and maximum in-department treatment would consist of in-department treatment at these two departments with end-of-pipe treatment of the remaining waste streams.

In Table 2 the capital & operating cost estimates provided by CED are given for each of the three cases studied.

The costs in Table 2 represent incremental costs over those already being incurred for in-department and end-of-pipe treatment. Thus, total pollution control investment and operating costs must include those presently being incurred. However, for Case 2, the high level of organic reduction achieved through in-process treatment would probably obsolete the biological portion of the existing waste treatment plant.

Table 2

WASTE TREATMENT CAPITAL & OPERATING COST ESTIMATES

| Description Case | New Capital, \$M | | | Operating Cost \$M | | |
|----------------------------|------------------|------|------|--------------------|-----|-----|
| | 1 | 2 | 3 | 1 | 2 | 3 |
| Site Support Projects | | | | | | |
| Tertiary Treat. | 7.8 | 3.0 | 4.2 | 4.3 | 0.7 | 1.3 |
| Sludge Disposal | 6.0 | 2.8 | 5.1 | 1.8 | 1.2 | 1.7 |
| Chromium Removal | 0.5 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 |
| Total Site | 14.3 | 6.3 | 9.8 | 6.5 | 2.0 | 3.1 |
| In-department Projects | | | | | | |
| BzCl/HCl | | 1.3 | | | 0.4 | |
| Phos. Ester | | 3.6 | 3.6 | | 0.4 | 0.4 |
| Phthalic | | 2.4 | 2.4 | | 1.0 | 1.0 |
| S-160 | | 1.8 | | | 0.8 | |
| S-100, Aqueous | | 0.4 | | | 0.1 | |
| S-100, HCl | | 1.7 | | | 0.4 | |
| TCPA | | 2.2 | | | 0.5 | |
| Total In-Process | | 13.4 | 6.0 | | 3.6 | 1.4 |
| Total All Projects (1975) | 14.3 | 19.7 | 15.8 | | 5.6 | 4.5 |
| Total All Projects (1982)* | 24.4 | 33.0 | 25.6 | | 9.6 | 7.7 |

* Escalation 1975 to 1982 = $(1.08)^7 = 1.71$

Accuracy is estimated to be $\pm 30\%$ on all numbers

| Case | 1 | 2 | 3 |
|--|------|------|------|
| 1982 Operating Cost + 20% of New Capital , \$M/yr. | 16.0 | 16.2 | 12.8 |
| Effluent Quality: | | | |
| M GPD Flow | 1.5 | 0.8 | 1.0 |
| Lbs. Organics/Day | 144 | 144 | 144 |
| Klbs. Inorganic Salts/Day | 163 | 47 | 163 |

Acknowledgements

The Committee is indebted to the input provided by the Technical Services Department of the Delaware River plant, the process research assistance provided by Process Chemicals, Plasticizers, and Specialty Products personnel, the engineering input supplied by the various functions within Corporate Engineering, and previous committee members.

MCO 5358870

V. DETAILS

A. Site Selection Rationale

In order to determine what could be done and what the cost would be to completely clean up a plant effluent the Delaware River Plant was selected for the model study for the following reasons:

1. It is relatively new and modern.
2. It is relatively small and simple (as compared to larger complexes) yet is representative of several different types of technology.
3. It has a modern biological waste treatment plant which can serve as an integral part of more complete treatment facilities.

B. Technology

Several different approaches could possibly achieve zero discharge at the Delaware River Plant. The technology described in this report includes suggested treatments as supplied by the various business groups involved but this is not meant to imply that other type operations would not attain the same end results. One of the premises of this study dictated that no process research would be conducted or requested to validate the proposed procedures. Rather we would limit proposals to current knowledge or conjecture based on this knowledge. Ideas and advice were solicited from the business groups involved and, in most instances, the process modifications described in the separate departmental treatments represent their recommendations. Chromium removal and tertiary treatment, with related costs, were developed utilizing information based on outside practice.

Ten individual products are manufactured at the Delaware River Plant as well as two blends. HCl is generated as a by-product. This report describes proposed treatments for the following products:

1. Phthalic Anhydride
2. Benzyl Chloride (BzCl)
3. Santicizer 160 (S-160)
4. Santicizer 148 (S-148)
5. Santosol 100
6. Tetrachlorophthalic Anhydride (TCPA)
7. HCl

The remaining four individual products are analogues of one of the above, are similar in mode of manufacture, and utilize essentially the same facilities. Santicizer 141 (S-141) and Santicizer 144 (S-144) are analogues of S-148 with substitution of 2-ethyl hexanol and iso-octanol for iso-decanol. Santicizer 261 (S-261) and Santicizer 278 (S-278) are analogues of S-160 wherein C₇-C₉ alcohol and Texanol (C₁₂

alcohol) are substituted for butanol respectively. It is assumed that these four products could be handled in the waste treatment facilities provided for the others in the preceding list.

By-product HCl arises from several of the processes. Where possible, these streams have been combined for recovery purposes.

The blends, Santicizer 526 and Santicizer 533, are mixtures of light alkylated naphthas and do not involve reaction steps and so are considered to be non-polluting. Treatment facilities are, therefore, not relevant.

The processes included in this study are described in the following section of this report. Process flow diagrams and material balances are given with existing and new capital equipment items highlighted. New capital costs are itemized.

1. Phthalic Anhydride

This process is based upon technology described in the Standard Manufacturing Process for Phthalic Anhydride at the Delaware River Plant modified to eliminate pollution as suggested by C. C. Sisler and N. F. Mueller. See Figure 1.

a) Process

Phthalic anhydride is produced by the partial oxidation of naphthalene by contact with a vanadium catalyst in two fluidized bed reactors. Oxygen for the reaction is supplied by a stream of air and the atomized naphthalene is fed to the reactor. The process stream containing phthalic anhydride (as well as by-products) and entrained catalyst passes through catalyst filter cases, a liquid product condenser, two solid product and final product condensers.

The condensed phthalic anhydride is collected in a crude storage tank and then transferred to the refining section where it is heat treated to copolymerize by-product maleic anhydride and naphthaquinone. It is then fractionated under vacuum in a batch still. The product goes to storage.

b) Effluent Treatment

1) Proposed In-Department

Condenser off-gas, treater off-gas, column jet discharge, storage tank vents would be sent to a burner.

Still overheads and bottoms would be sent to a liquid incinerator.

There would be no other effluent streams except for gases issuing from the stacks of the burner and liquid incinerator.

2) Current Treatment

Condenser off-gas is now sent to a scrubber where the bulk of the organics are removed and are sent to waste treatment. The remainder of the organics, as well as gases, including CO are stacked.

Treater off-gas is scrubbed and the organics are sent to waste treatment.

Column overheads and bottoms are sent to landfill.

3) Alternate Treatment

The scrubber presently employed for the condenser off-gas could be retained but made more efficient. The effluent from this scrubber could then be sent to secondary treatment assuming this facility could handle the load. Another possibility would be to evaporate the scrubber solution to the point where it could be incinerated.

The treater off-gas and other vents might still be scrubbed and sent to secondary treatment.

The still bottoms might be sent to landfill.

2. Benzyl Chloride/HCl

This process is based upon technology described in the W GK Scope Report and from notes and suggestions by Messrs. C. C. Sisler and M. A. Terpstra. See Figure 2.

a) Process

Toluene is reacted with chlorine in the presence of light to give benzyl chloride and minor amounts of by-products. HCl is formed as a by-product passing successively through water and Freon condensers and sent to a HCl recovery unit for manufacture of 20.5° Be' acid. The chlorination mass is fed continuously to a stripper. Toluene is removed overhead, condensed and recycled to the chlorinator. The benzyl chloride and high boilers from the bottom of the column are fed to the refining column. The benzyl chloride is removed overhead and sent to product storage. The high boiling residue is pumped to the residue storage tank and sold for its benzal chloride content.

b) Effluent Treatment

1) Proposed In-Department

The Cl_2/HCl effluent from the reaction together with its toluene content would go to the absorber as would the vent from the refining column. The off-gases from the absorber would be combined with the stripper vent gases and would pass through a condenser and then to a cyclone separator. The bases from the cyclone would then go to a dryer. The dried chlorine-containing gas would then go to a reactor. The liquid from the cyclone separator would be combined with a waste stream from S-160 manufacture. The organic/aqueous mixture would be filtered and go to a separator for separation of the two phases. The aqueous system would be recycled to the absorber. The organic phase would be sent to the reactor for removal of chlorine from the gas stream. The vapors from the reactor would be scrubbed and sewered. The liquid from the reactor would be incinerated.

The bottoms from the refining still would be sold, as is done presently, or incinerated if no market exists.

The HCl from the absorber would be treated, as at present, and sold.

2) Current Treatment

The bases from the reactor are sent to the absorber for removal of HCl . The HCl is treated with carbon, sent to a deionizer and collected for sales. The off-gas from the absorber is passed through a surface condenser for removal of residual HCl which is sewered. The non-condensed gases go to a caustic scrubber. The effluent from the scrubber containing NaOCl , NaCl , NaOH , water, and traces of toluene is sewered.

The gases from the toluene stripper are passed through a contact condenser and the HCl , water and toluene are recycled to the absorber. Chlorine from the condenser is scrubbed with water and sewered.

The vent gases from the refining column are passed through a contact condenser and the condensate is sewered.

3) Alternate Treatments

If the chlorine recovery process should not work out, the chlorine might be dried and piped to the TCPA department or compressed.

Another alternative might be to continue to use the packed caustic scrubber in the HCl system vent and add facilities for reduction of the hypochlorite by use of sodium sulfite.

Partial water re-use could be devised, e.g. water from the refining contact condenser might be used for the toluene stripper vent scrubber. Or both scrubbers could use recirculating water, with caustic and sulfite additions and a draw-off of water, NaCl, and Na₂SO₄ to secondary treatment.

3. Santicizer 160

This process is based upon technology described in the WCK Scope Report and from notes by R. H. Mills. See Figure 3.

a) Process

Phthalic anhydride is reacted with butanol in the presence of triethylamine to form the half ester salt. The amine salt is cooled and reacted with benzyl chloride in a cascade series of reactors. The reaction mass (a slurry of amine hydrochloride in crude phthalate ester) overflows to a salt dissolver. Dilute HCl is fed in to dissolve the hydrochloride and to neutralize any free amine present.

The ester/aqueous mixture is fed to a decanter system where separations and washings occur. The washed crude ester is passed through a steamer to remove volatile impurities. The steamed crude is pumped to a decolorizer where it is treated with peracetic acid in the presence of soda ash. The decolorized product is then pumped to a refining wash system. After washing it is dried by passing through a column. The dried ester is filtered and sent to storage.

The triethylamine salt from the first decanter is neutralized with lime. The free amine is then put through a still system to recover dry triethylamine which is recycled.

b) Effluent Treatment

1) Proposed In-Department

Wash water would be recycled greatly reducing the volume of wash water employed. Water from each of the refining washes would be recycled to the preceding wash. This procedure would be extended to the caustic wash. In this case the water phase would be put through a settling tank to allow any S-160 to separate -- this would be recycled. It would then be acidified with hydrochloric

acid and allowed to settle. The half ester would be removed and incinerated. The water phase would go back to the washers. This would eliminate all of the sewer streams except for those coming from TEA recovery.

The TEA would be liberated by use of a lime slurry and sent to a stripper. The stripped aqueous solution would then go to a hydrolyzer for breakup of the quat salt and then go to a secondary stripper for recovery of amine. The bottoms from the stripper would be filtered to remove calcium phthalate which would be incinerated. The filtrate containing traces of amine and calcium acetate would be sent to secondary treatment.

The product S-160 would be filtered to remove a small amount of solids and the filter cake would be incinerated.

2) Current Treatment

The caustic wash is being separated and the water phase is being sent to secondary treatment. The oil phase is steamed and the condensed volatiles are sent to secondary treatment along with the volatiles from TEA stripping. The steamed crude S-160 is decolorized and sent to washing. The aqueous layers from the washes are separated, collected, and sent to secondary treatment.

The bottoms from the TEA stripper is sent to secondary treatment.

3) Alternate Treatment

None.

4. Santicizer 148

This process is based upon technology described in the Standard Manufacturing Process for Santicizer 148 at the Delaware River Plant and Process for Engineering Design for Phosphate Ester Wastewater Treatment as basis for CEA 3032. See Figure 4.

a) Process

Isodecyl alcohol is added to phosphorous oxychloride to give the dichloridate. HCl is generated and is scrubbed. Heat and vacuum are applied to remove remaining HCl and to complete the reaction. The dichloridate is reacted with sodium phenate which had been prepared by adding phenol to caustic. The crude ester is separated from the salt layer and is sent to refining.

The crude ester is washed continuously in a six-stage mixer/settler system. Caustic is added in the first stage to solubilize phenol and the partial esters. The remaining stages are water washes. The washed product is vacuum steam stripped in a column to free it from low boilers and water. The product is then filtered and sent to storage.

b) Effluent Treatment

1) Proposed In-Department

The product mixer-settler washing system would be converted from the existing crosscurrent water flow mode to counter-current flow. The effluent from the washing system would be reused as a water feed to the existing HCl off-gas scrubber in the reaction area thereby reducing the water load. Water would be used in barometric condensers.

The salt layer, the steamer condensate, and caustic washes would be neutralized and adjusted to pH 4 to hydrolyze monophenylphosphate and to liberate phenol. The stream would then be adjusted to pH 1 with recovered HCl from the process and extracted with methyl isobutyl ketone in a four stage countercurrent mixer-settler combination.

Solvent in the raffinate would be removed in a stripper and returned to the system. The stripped raffinate would be sent to secondary treatment. The extract would be fractionated in a semi-continuous still to recover solvent and phenol overhead. The phenol would be recycled to the process. The still bottoms, which contains the remaining partial esters, would be incinerated.

By-product HCl, as has been mentioned, would be used to neutralize the reaction mass and washes, to hydrolyze the partial esters and to adjust the pH to facilitate extraction. Residual HCl would be sewered and not recovered.

2) Current Treatment

The vapors from the first reactor containing HCl, and some POCl_3 , are contacted with water and the condensate, after neutralization, is sent to secondary treatment.

The aqueous salt layer, following the final reaction, is separated in the salt settling tank and is sent to secondary treatment.

MCO 5358877

The ester layer is washed with caustic, and then with water in mixer-settlers. The aqueous layers are combined from the settlers and go to secondary treatment.

The product is then steamed in a column. The overheads from the stripper go to a separator. The organic phase from the separator is incinerated; the aqueous phase is sent to secondary treatment.

The product is filtered. The filter cake and product holdup is sent to landfill.

3) Alternate Treatment

In the extraction process the hydrolysis step might be left out and this would reduce capital requirements. The monophenylphosphate in this case would wind up in secondary treatment where presumably it would biodegrade -- loading would be a key factor.

An alternative process based upon the use of hollow fiber technology may be feasible. In this case the salt layer and washer would be adjusted to pH 6-7 and would be sent to hollow fiber modules. The phenol would migrate through the membrane and react with caustic solution. The sodium phenate would be recycled back to the process. The partial esters which do not pass through the membrane together with the salts would be sent to the secondary treatment plant.

5. Santosol 100

This process is based upon the process in operation at the Delaware River Plant modified to eliminate pollution as suggested by J. C. Wygant. See Figure 5.

a) Process

Benzyl chloride and excess ethylbenzene are reacted in the presence of aluminum chloride catalyst and a nitromethane catalyst modifier to give monobenzylethylbenzene. Dibenzylethylbenzene and polybenzylated products are side reaction products. HCl which is generated is quenched and sewerred. The catalyst is removed by washing with sodium hydroxide solution. The product is then water washed.

The washed reaction mixture is stripped of excess ethylbenzene which is recycled to the process. The bottoms product is filtered and sent to storage.

b) Effluent Treatment

1) Proposed In-Department

The aqueous phase from the primary settling tank which contains considerable ethylbenzene and Santosol 100 as well as inorganic materials would be filtered to break the emulsion. Filtered solids would be incinerated. The oil phase would be returned to the refinery feed tank. The filtrate would be neutralized with HCl to liberate nitromethane and steam stripped to remove this material as well as small quantities of ethylbenzene and Santosol 100. These organics would be incinerated. The stripped aqueous phase would be recycled to the neutralizer.

Water decant streams from the ethylbenzene storage tanks, refinery feed tank, and distillate ethylbenzene receiver would be recycled to the primary settling tank. Condensate from the steam ejector system would also be recycled to this tank.

Hydrogen chloride from the reaction step would be absorbed in water in an adiabatic absorber. The oil phase which separates would be incinerated. The HCl solution would be treated with carbon to remove residual organics and would go to sales.

After about every 275 batches of Santosol 100, monochlorotoluene must be fractionated from the ethylbenzene. The heel from this distillation, monochlorotoluene, would be incinerated. This is done currently.

2) Current Treatment

The aqueous phase from the primary settling tank is sent to secondary treatment. The oil phase goes to the refinery feed tank and then to the distillation column.

Decant streams are sent to secondary treatment. The condensate from the steam ejector system is recycled to the primary settling tank.

Hydrogen chloride is scrubbed with water and the acid solution is neutralized and sent to secondary treatment.

3) Alternate Treatment

A "dry" process for the manufacture of Santosol 100 as described in Report P-1668 Interim Process for Santosol 100. This process was used to manufacture Santosol 100.

at the J. F. Queeny Plant in 1972. Modifications would be employed to eliminate pollution.

Hydrogen chloride recovery would be as in the proposed in-department procedure.

Decant water phases from the ethylbenzene storage tanks, refinery feed tank, and distillate ethylbenzene receiver would go to the neutralization step.

A vacuum pump would substitute for the current steam ejector system.

Filtered solids from neutralization would be landfilled or incinerated.

Redistillation of ethylbenzene to remove monochlorotoluene would be required as in the other treatment procedures.

6. Tetrachlorophthalic Anhydride

This process is based upon technology described in the Standard Manufacturing Process for Tetrathal at the Delaware River Plant modified to eliminate pollution as suggested by J. F. Quinn. See Figure 6.

a) Process

Tetrachlorophthalic anhydride is produced by reacting phthalic anhydride and chlorine in the presence of a molybdenum pentachloride (MoCl_5) catalyst in a three vessel cascaded reactor system. The system has a design capacity of 10.8M lbs/yr of tetrathal.

Molten phthalic anhydride is added batchwise to the first reactor where the chlorination begins. Catalyst is added to the first or second reactor. Chlorination is completed in the second vessel and residual catalyst is stripped out in the third vessel. Gaseous chlorine is added continuously to the third reactor and passes in series through the second and first reactors. Switch condensers on the first reactor collect raw material, catalyst and intermediates and cool the exit gases.

The exit gases from the first vessel are scrubbed with water to remove the HCl . The chlorine remaining in the gas stream is scrubbed with lime in a two-stage scrubber and vented to the atmosphere. The effluent liquors from the HCl and chlorine scrubbers are neutralized and are sewered.

Molten TCPA from the stripper is flaked, cooled and packaged.

b) Effluent Treatment

1) Proposed In-Department

The process presents difficulty in waste treatment because of the properties of the reactants and product. Molybdenum chloride volatilizes but must be contained. Chlorine in the effluent should be kept to a minimum. The product is high melting and difficult to handle.

It is suggested that the chlorinators currently in use be retained. Another chlorinator would be added and would be operated under suitable conditions to complete chlorination. A scrubber/reactor would be added, run slightly above the crystallizing point of phthalic anhydride, to remove residual MoCl_5 and TCPA which would be returned to the process. A small portion of chlorine which might remain unreacted would be scrubbed with caustic after HCl absorption. A small amount of phthalic anhydride which also might come through would be taken out as the acid by carbon adsorption after HCl absorption.

If the HCl is not salable, it would be neutralized with lime and the stream directed to secondary treatment without carbon adsorption.

2) Current Treatment

The gases from the chlorinators are scrubbed with water. The organics, MoCl_5 and HCl contained in the scrubber liquor are neutralized and sewerred. The chlorine from the scrubber is combined with chlorine from the flaker feed tank (with its TCPA content) and is treated with lime slurry. The hypochlorite/chloride mixture containing some TCPA is sewerred.

3) Alternate Treatment

Instead of taking the gases from the chlorinator system and the flaker feed tank directly to the lime tank, as at present, and instead of sending the effluent from the lime tank directly to the sewer add:

- (a) A carbon tower to remove organics
- (b) An HCl absorber system to convert HCl to muriatic acid for sale.
- (c) A system to reduce the hypochlorite formed in the lime tank using sodium sulfite.

Alternatively the chlorine coming off the top of the HCl absorber might be dried, cleaned up and recycled to the process rather than drained in the lime tank.

Difficulty associated with this approach is the possibility of plugging of the carbon towers because of the high crystallizing point of the product. This would also presuppose that MoCl_5 , as well as organics would be absorbed in carbon which may not be the case.

7. Tertiary Treatment

a) Process (See Figure 7)

For Cases 1 and 3 the influent to the tertiary treatment process would be the effluent from the existing biological waste treatment process.

For Case 2 (maximum in-dept. reductions) the influent to tertiary treatment would be the effluent from the existing primary clarifiers. The significant reduction in organic loading would most likely obsolete the biological treatment section of the existing facility.

The tertiary treatment process consists of sand filtration, carbon adsorption and activated carbon regeneration. Sand filtration of the biological clarifier overflow to remove suspended solids is necessary to prevent plugging of the carbon towers. These filters are commonly used in water purification plants. Filter backwash for solids cleaning is redirected to either the primary or secondary clarifiers in the existing plant for removal. Forward flow from the filters enters the carbon towers for organic pollutant removal. Effluent quality is assumed to be equal to or better than raw well water. Multiple carbon towers are provided to allow parallel operation. When breakthrough occurs, the carbon is removed to a regeneration furnace. The carbon is reactivated by thermal decomposition of the adsorbed organics. The carbon, plus makeup, is returned to the tower for reuse.

The use of carbon adsorption technology at Delaware River was studied briefly in 1972 during treatability testing for the biological treatment plant. It was not proven technically and further column test work is necessary to determine if well water quality effluent can be achieved. Thermal regeneration has not been studied at all.

MCO 5358882

8. Sludge Disposal

a) Process (See Figure 7)

Sludge disposal facilities envisioned would consist of equipment to thicken and dewater dilute waste treatment plant sludges and an incinerator capable of burning these dewatered sludges in combination with various filter aid solids generated from in-dept. treatment systems. Landfill would be utilized as the ultimate disposal for incinerator ash.

Supernatant from the dewatering equipment would be recycled to the waste treatment plant. The incinerator would be similar to a rotary kiln and equipped with a wet scrubber for control of particulates and acid gases. Chlorinated material would be present in all cases necessitating the wet scrubber. The scrubber effluent would be returned to the waste treatment plant for neutralization. Residual solids from the incinerator would be hauled off-site to a contract landfill.

9. Chromium Removal

The source of 96% of all chromium in the effluent is the tempered water system located in the phthalic anhydride department. The remainder comes from the three cooling towers. In this study it is assumed that no alternate corrosion inhibitor will be found for tempered water hence it will be necessary to provide facilities for removal of chromium.

The Delaware River Plant has considered (see D. R. TSD Report 75019) several different methods for removal of chromium including use of reverse osmosis and ion exchange. In the case of reverse osmosis, a packaged and assembled system including pump, permeator modules, instrumentation and controls could be purchased. Tankage and minor amount of other equipment would have to be installed. It is assumed that the operating cost of such a unit would be low. In the case of ion exchange, standard cation/anion exchange resin beds would be installed together with suitable additional equipment for storage and handling. Resin bed replacement as well as other chemicals would be required in addition to sludge disposal.

CED has assumed that either procedure described above would be satisfactory for chromium removal and has roughly estimated the cost of such treatment. For the purposes involved in this report the costs are considered to be equivalent.

MCD 5358883

C. Process Flow Diagrams

1. Phthalic Anhydride
2. Benzyl Chloride/Muriatic Acid
3. Santicizer 160
4. Santicizer 148 (Waste Treatment only)
5. Santosol 100
6. Tetrathal
7. Site Support Zero Discharge Waste Treatment

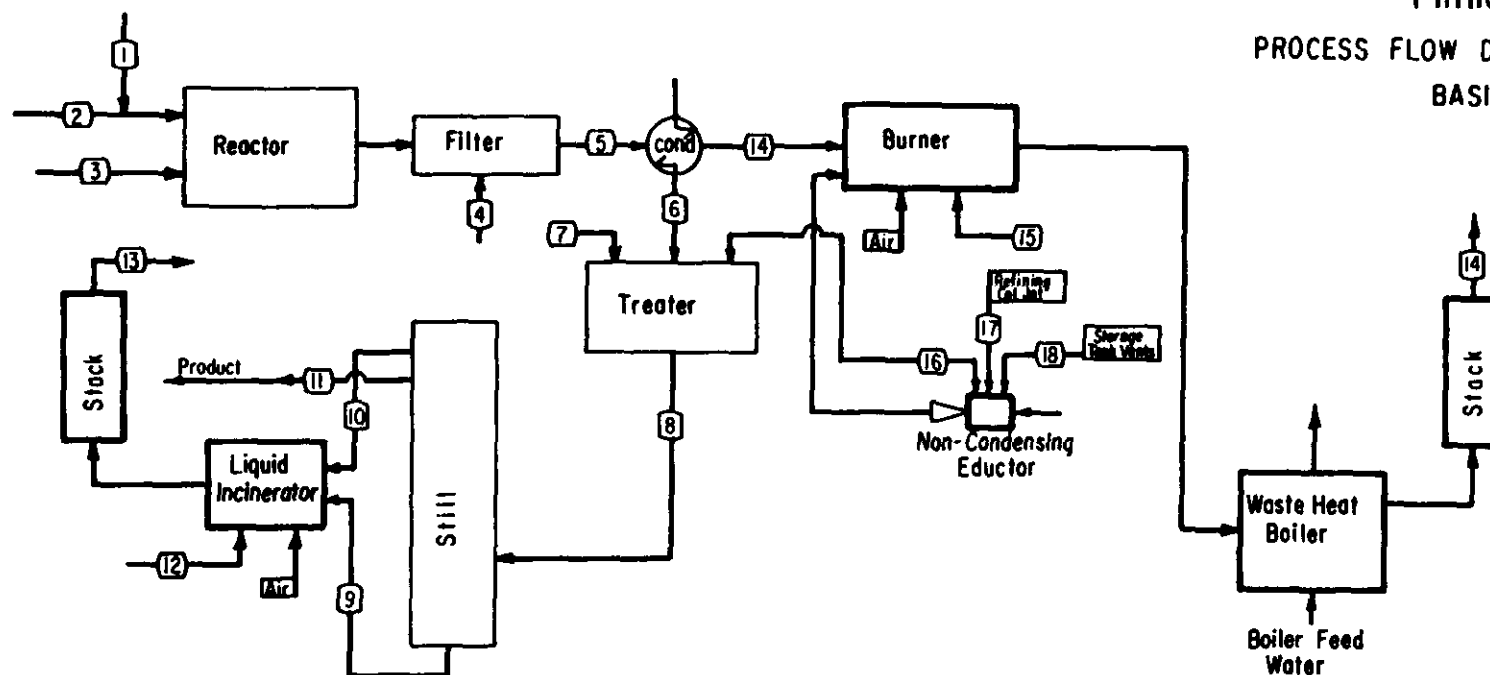
MCO 5358884

Figure 1
Phthalic Anhydride

PROCESS FLOW DIAGRAM / MATERIAL BALANCE

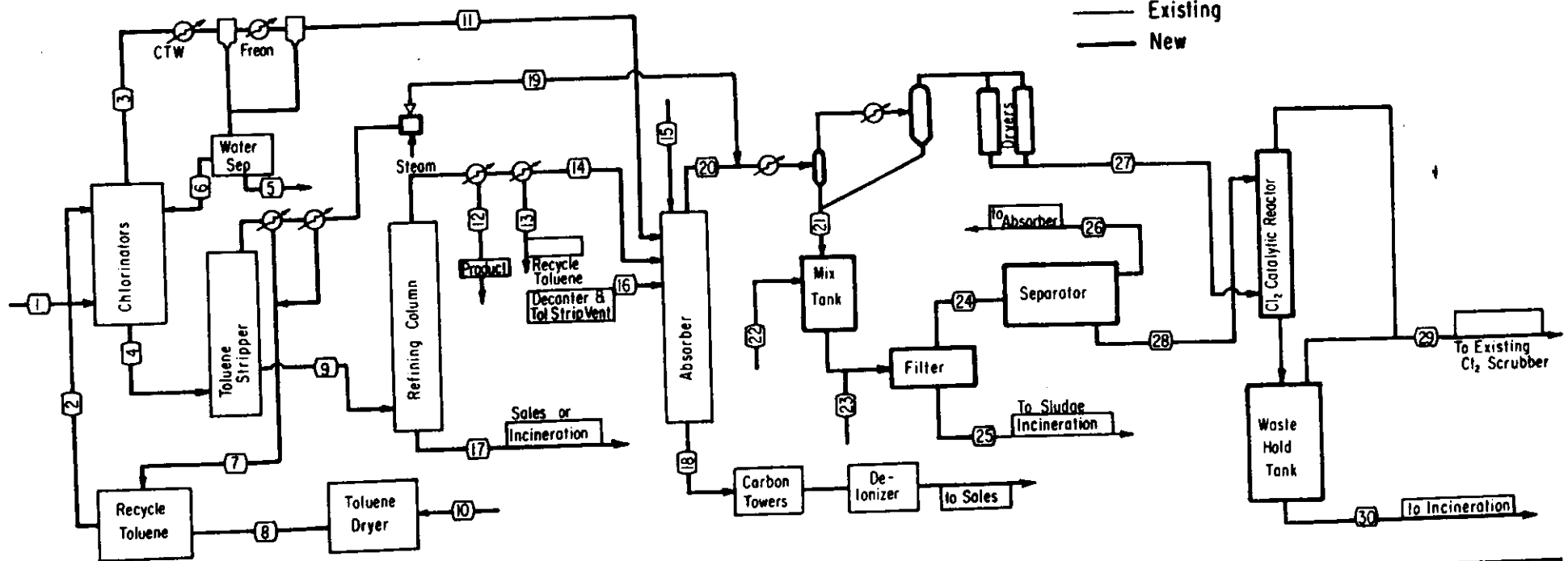
BASIS 100 M Lbs./Yr.

— Existing
— New



| Component | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|--------------------|-----|-------|--------|-------|--------|-------|-----|-------|-----|----|-------|-----|-----|--------|------|----|----|------|------|
| Water | 10 | | 1380 | 242 | 5174 | | | | | | | | Yes | 5174 | | | | | Yes |
| Nitrogen | 727 | | 91093 | 16059 | 107879 | | | | | | | | Yes | 107879 | | | | | Yes |
| Oxygen | 220 | | 27580 | 4849 | 17667 | | | | | | | | Yes | 17667 | | | | | Some |
| Naphthalene | | 12002 | | | | | | | | | | | | | | | | | |
| Lithium Hydroxide | | | | | | | 1.6 | | | | | | | | | | | | |
| Phthalic Anhydride | | | | | 12121 | 11843 | | 11595 | | 10 | 11415 | | | 304 | | 63 | 14 | Some | 15 |
| Phthalic Acid | | | | | | | | | | | | | | | | | | | |
| Maleic Anhydride | | | | | 240 | 27 | | | | | | | | 241 | | | | | 12 |
| Naphthalquinone | | | | | 240 | 180 | | | | 1 | | | | 63 | | | | | 3 |
| Pitch | | | | | | | | 365 | 365 | | | | | | | | | | |
| CO ₂ | | | | | 9721 | | | | | | | | Yes | 9721 | | | | | Yes |
| CO | | | | | 965 | | | | | | | | Tr. | 965 | | | | | Tr. |
| Fuel Oil | | | | | | | | | | | | 200 | | | 3000 | | | | |
| Total (LB/HR) | 957 | 12002 | 120053 | 21150 | 154007 | 12050 | 1.6 | 11960 | 365 | 11 | 11415 | 200 | | 142014 | 3000 | 63 | 14 | - | 30 |

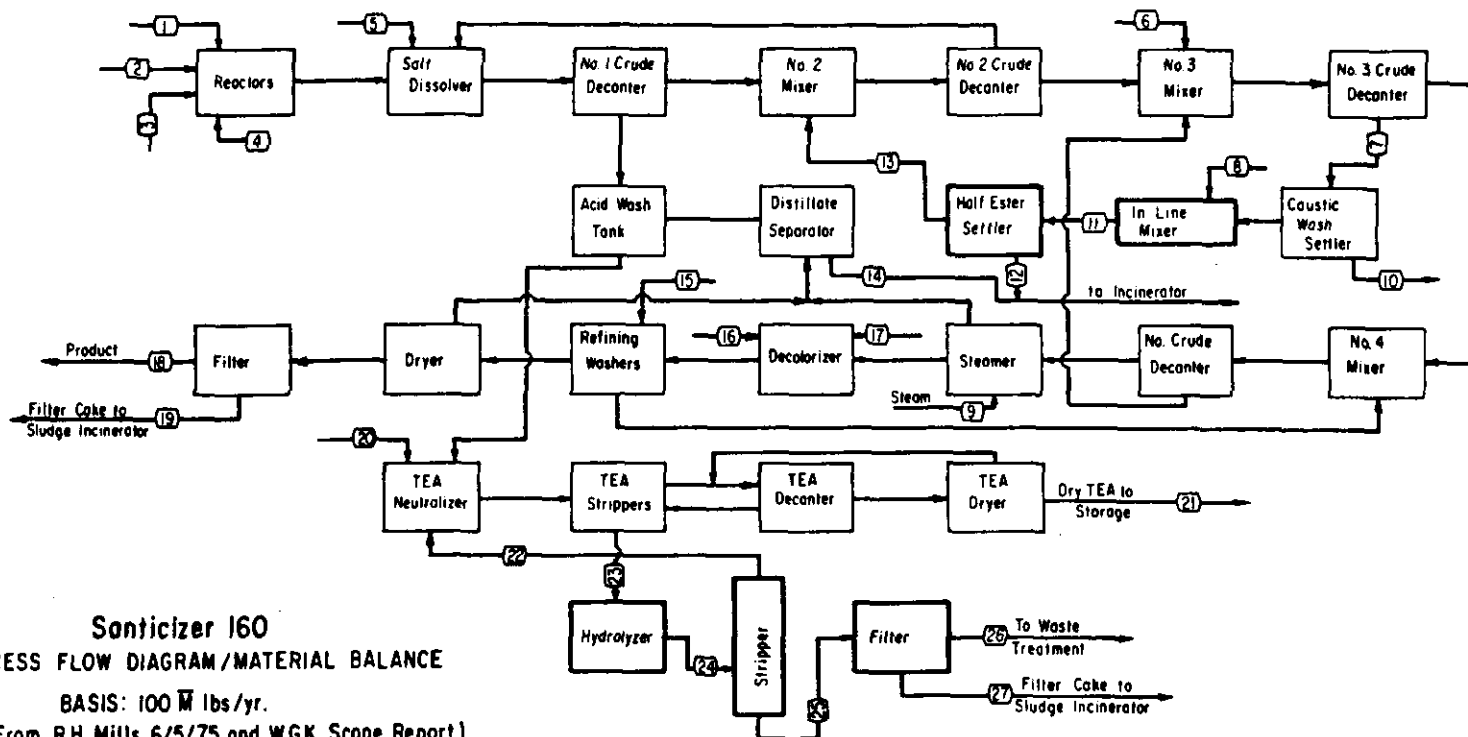
Figure 2
Benzyl Chloride/Muriatic Acid
PROCESS FLOW DIAGRAM/MATERIAL BALANCE
Basis: 1.33 WGK Scope



| Stream | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
|-------------------|------|-------|------|-------|---|------|-------|------|-------|------|------|-------|----|----|------|------|-----|-------|-----|------|------|-----|----|------|----|------|-----|------|-----|------|----|
| Component | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| Chlorine | 7310 | | 63 | 11 | | | | | | | 63 | | | | | | | | 11 | 73 | 2 | | | 2 | | 1 | 82 | 1 | 5 | Some | |
| Toluene | | 51604 | 3630 | 42408 | | 3559 | 42402 | 9202 | 19 | 9202 | 70 | 9 | 92 | 1 | | | | | 4 | | | | | | 56 | | 52 | 7 | 4 | 1 | 10 |
| HCl | | | 3559 | 160 | | | | | | | 3559 | | | | | 205 | | 3720 | 27 | 36 | 56 | | | | 56 | | 52 | | | | |
| Water | | 1 | 1 | | 1 | | 1 | | | 1 | | | | 7 | 3808 | 6091 | | 7916 | 67 | 2000 | 2317 | | 10 | 2327 | | 2327 | | Some | | | |
| Benzyl Chloride | | 1596 | 61 | 13761 | | 61 | 1504 | | 12263 | | | 12091 | | | | | 27 | | | | | | | | | | | | | | |
| Benzal Chloride | | | 1 | 471 | | 1 | | | 471 | | | 36 | | | | | 435 | | | | | | | | | | | | | | |
| Monochlorotoluene | | | | | | | | | | | | | | | | | 32 | | | | | | | | | | | | | | |
| Residue | | | | | | | | | | | | | | | | 81 | | | 4 | 157 | 151 | 428 | | 577 | 2 | 10 | 10 | 567 | 1 | 649 | |
| Organics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NaOH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NaCl | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Na2SO3 | | | | | | | | | | | | | | | | | | | 48 | 115 | | | | | | | | | | | |
| Na2SO4 | | | | | | | | | | | | | | 53 | | | | | | | | | 1 | | | | | | | | |
| Air/N2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Filter Aid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total (LB/HR) | 7310 | 53201 | 7315 | 56817 | 1 | 3621 | 43907 | 9202 | 12753 | 9203 | 3692 | 12160 | 92 | 61 | 3808 | 6383 | 494 | 11636 | 157 | 2381 | 2526 | 428 | 11 | 2962 | 1 | 2330 | 262 | 572 | 170 | 649 | |

988855 DOW

Figure 3



Santicizer 160

PROCESS FLOW DIAGRAM/MATERIAL BALANCE

BASIS: 100 M lbs/yr.

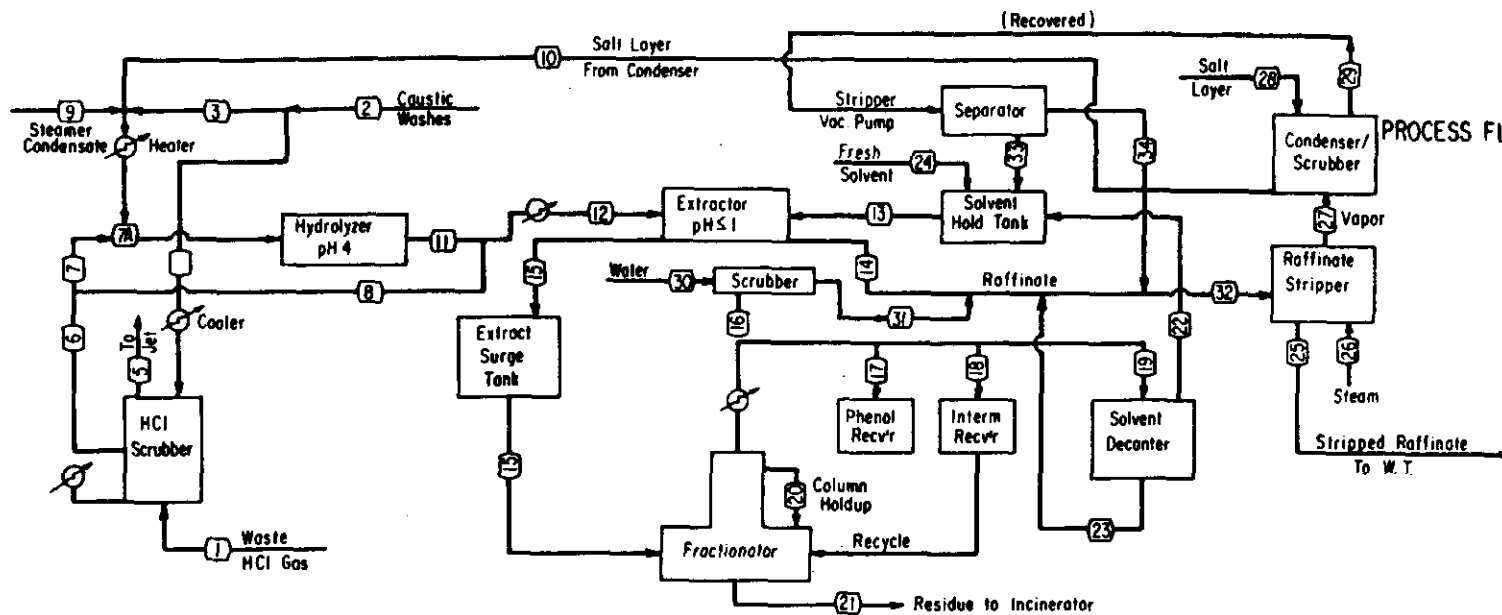
(From R.H. Mills 6/5/75 and W.G.K. Scope Report)

— Existing
— New

MCO 5358867

| Stream | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|------------------------|------|------|------|------|-----|------|------|-----|------|----|------|-----|------|-----|-------|----|-----|-------|----|-------|------|------|-------|-------|-------|-------|-----|
| Component | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| Phthalic Anhydride | 5933 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Butanol | | 3090 | | | | | | | | | | | | 12 | | | | | | | 13 | | | | | | |
| TEA | | | 4200 | | | | | | | | | | | | | | | | | | 4335 | 12 | 12 | 12 | Tr. | | |
| Benzyl Chloride | | | | 1350 | | | | | | | | | | 245 | | | | | | | | | | | | | |
| Benzal Chloride | | | | 25 | | | | | | | | | | 25 | | | | | | | | | | | | | |
| TFA-HCl | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water | | | | | 167 | 5000 | 5075 | 124 | 2209 | | 5147 | 7 | 1190 | | 15000 | | 100 | | | 1108 | | Some | 23501 | 23501 | 23501 | 23501 | |
| Peracetic Acid (40% a) | | | | | | | | | | | | | | | | | 12 | | | | | | | | | | |
| s-160 | | | | | | | | 25 | | 20 | 5 | 4 | 1 | 7 | | | 333 | 1260 | 5 | | | | | | | | |
| Ca(OH) ₂ | | | | | | | | | | | | | | | | | | | | 2270 | | | 270 | 268 | 268 | 18 | 250 |
| CaCl ₂ | | | | | | | | | | | | | | | | | | | | | | | 2292 | 2292 | 2292 | 2292 | |
| BuOH-BEON | | | | | | | | 10 | | 2 | 8 | 1 | 7 | | | | | | | | | 2 | Tr. | 2 | Tr. | Tr. | |
| Acetic Acid | | | | | | | | | | | | 18 | | 18 | | | | | | | | | | | | | |
| Na Acetate | | | | | | | | 25 | | | | | | | | | | | | | | | | | | | |
| Ca Acetate | | | | | | | | | | | | | | | | | | | | | | | 24 | 24 | 24 | 24 | |
| Half Ester | | | | | | | | | | | | 120 | 116 | 4 | | | | | | | | | | | | | |
| No Salt Ester | | | | | | | | 132 | | | | | | | | | | | | | | | | | | | |
| Ca Salt Ester | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phthalic Acid | | | | | | | | | | | | 8 | 4 | 4 | | | | | | | | | | | | | |
| Na Phthalate | | | | | | | | 10 | | | | | | | | | | | | | | | | | | | |
| Ca Phthalate | | | | | | | | | | | | | | | | | | | | | | | 45 | 49 | 49 | 49 | |
| NaCO ₃ | | | | | | | | 17 | | | | | | | | | | 17 | | | | | | | | | |
| NaOH | | | | | | | 71 | 20 | | | | | | | | | | | | | | | | | | | |
| HCl | | | | | 79 | | | 58 | | | 5 | | 5 | | | | | | | | | | | | | | |
| ADCA | | | | | | | | | | | | | | | | | | | | | 110 | 50 | 12 | 32 | 7 | 7 | |
| Over Salt | | | | | | | | | | | | | | | | | | | | | | | 64 | 6 | 6 | 6 | |
| Other | | | | | | 19 | | | | | 307 | | | 25 | | | | | 1 | 5 | | 8 | 83 | 100 | 100 | 100 | |
| Dibutyl Phthalate | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibutyl Phthalate | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibutyl Phthalate | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total (LB/HR) | 5933 | 3090 | 4208 | 1375 | 246 | 5056 | 5332 | 182 | 2209 | 22 | 5618 | 132 | 5229 | 314 | 15000 | 12 | 470 | 12606 | 10 | 33352 | 4485 | 64 | 26004 | 26010 | 25943 | 25644 | 299 |

Figure 4
Santicizer 148
 WASTE TREATMENT
 PROCESS FLOW DIAGRAM/MATERIAL BALANCE
 Basis: 60 M lbs/yr



BASIS: 30M LB/YR.

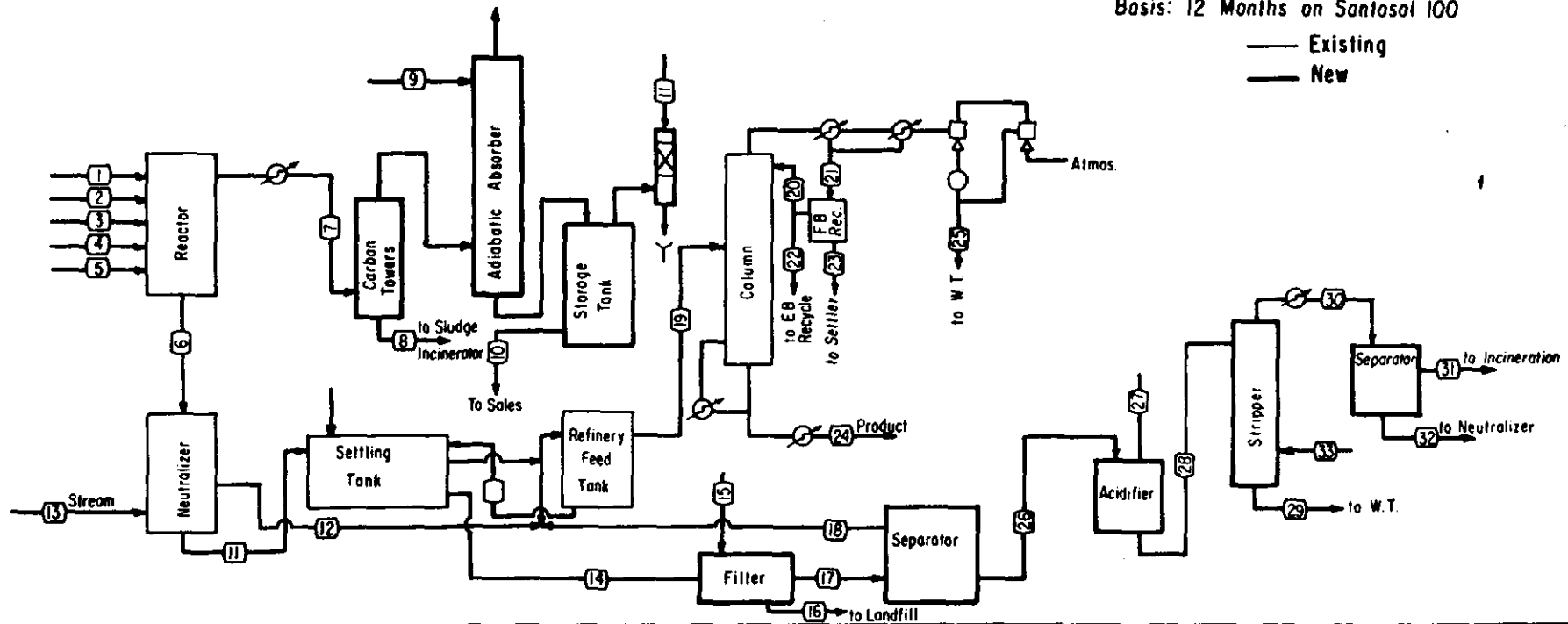
| Stream Component | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
|---------------------|-------|--------|--------|-------|------|-------|--------|--------|-------|--------|--------|--------|--------|--------|--------|-----|-------|------|--------|------|-------|--------|------|-----|--------|-------|-------|--------|------|--------|--------|---------|------|------|----|
| Phenol | | 114.1 | 67.1 | 47.0 | .4 | 46.6 | 37.2 | 9.5 | .8 | 85.9 | 205.7 | 115.2 | | 1.5 | 213.7 | | 184.7 | 13.5 | | 21.6 | 29.5 | | | | 1.5 | | | 85.9 | | | | 1.5 | | | |
| PAP | | 3.6 | 2.1 | 1.5 | | 1.5 | 1.2 | .3 | | 26.4 | 1.5 | 1.8 | | 1.4 | .4 | | | | | | .4 | | | | 1.4 | | | 26.4 | | | | 1.4 | | | |
| IAP | | 5.2 | 3.2 | 2.0 | | 2.0 | 1.6 | .4 | | 24.8 | 29.6 | 30.0 | | | 30.0 | | | | | | 30.0 | | | | | | | 24.8 | | | | | | | |
| DPAP | | 8.3 | 4.9 | 3.4 | | 3.4 | 2.7 | .7 | | 39.7 | 47.6 | 48.3 | | | 48.3 | | | | | | 48.3 | | | | | | | 39.7 | | | | | | | |
| PIAP | | 3.6 | 2.1 | 1.5 | | 1.5 | 1.2 | .3 | | 86.4 | 89.7 | 90.0 | | | 90.0 | | | | | | 90.0 | | | | | | | 86.4 | | | | | | | |
| Water | | 3674.4 | 100.7 | 66.7 | 76.4 | 662.2 | 5273.3 | 1349.3 | 311.2 | 4032.2 | 2876.2 | 2021.2 | 22.8 | 2100.2 | 43.8 | | | | 43.8 | | | 22.5 | 21.3 | | 2990.6 | 692.2 | 560.2 | 753.8 | 47.2 | 3762.2 | 8776.2 | 29776.2 | .4 | 46.6 | |
| HCl | 398.4 | | | | | 365.7 | 291.2 | 74.5 | | | 74.5 | | 74.5 | | | | | | | | | | | | | 74.5 | | | | | | 74.5 | | | |
| NaCl | | 17.0 | 10.2 | 6.8 | | 58.9 | 46.9 | 12.2 | | 1098.2 | 162.2 | 1633.2 | | 1633.2 | | | | | | | | | | | 1633.2 | | | 1098.2 | | | | 1633.2 | | | |
| NaOH | | 114.1 | 68.6 | 45.5 | | | | | | 44.1 | | | | | | | | | | | | | | | | | | | 44.1 | | | | | | |
| MIBK | | | | | | | | | | 32.8 | 36.0 | 36.0 | 34.2 | 53.6 | 138.2 | 4.2 | 4.3 | 15.0 | 1377.7 | | | 1377.7 | | .7 | 5.0 | 0.7 | 59.3 | | 26.5 | | 4.2 | 60.0 | 25.6 | 1.5 | |
| MIBK Imp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Olefin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Isodecanol | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Boilers | | 21.2 | 12.4 | 8.8 | | 8.8 | 7.0 | 1.8 | | 6.5 | 25.9 | 27.7 | | | 27.7 | | | | | | 27.7 | | | | | | | 6.5 | | | | | | | |
| Others | | | | | | | | | | | 12.9 | 12.9 | | 12.9 | | | | | | | .4 | | | | | 12.9 | | | | | | 12.9 | | | |
| Total (LB/HR) | 398.4 | 1703.1 | 1024.3 | 678.8 | 76.4 | 711.0 | 5662.2 | 4480.5 | 311.8 | 5477.2 | 2738.2 | 2318.2 | 2427.2 | 2277.2 | 1836.2 | 4.2 | 189.0 | 27.5 | 2421.5 | 22.0 | 226.2 | 1400.2 | 22.0 | 5.0 | 2963.0 | 69.2 | 620.2 | 4930.2 | 73.5 | 8708.2 | 6712.2 | 21559.2 | 25.4 | 46.6 | |

8888565 03W

Figure 5
Santosal 100
PROCESS FLOW DIAGRAM/MATERIAL BALANCE

Basis: 12 Months on Santosal 100

— Existing
— New



| Stream Component | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | | |
|----------------------|--------|--------|--------|------|------|--------|-------|------|--------|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|-----|--------|-------|--------|-------|-------|--------|-------|-------|-------|-------|-------|--|
| Aluminum Chloride | | | | | 22.0 | 22.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nitro Methane | | | | 21.0 | | 21.0 | | | | | | | | | | | | | | | | | | | | | | 21.0 | | 21.0 | 21.0 | | | | |
| Ethyl Benzene | 5834.0 | 1451.0 | | | | 3918.0 | 2.3 | 2.3 | | | 66.0 | 337.0 | | 84.5 | 0.1 | 84.4 | 80.0 | 3917.0 | 567.0 | 4509.0 | 3909.0 | | | 3.5 | 3.5 | 4.1 | | 4.1 | | 4.1 | 4.1 | | | | |
| Benzyl Chloride | | | 2114.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hydrogen Chloride | | | | | | 37.0 | 567.0 | | | 567.0 | | | | | | | | | | | | | | | | | 132.0 | | | | | | | | |
| Carbon | | | | | | | | 23.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Santonal 100 | | | | | | 2877.0 | | | | | 66.0 | 217.0 | | 66.0 | 0.1 | 59.9 | 57.0 | 2874.0 | | | | | | 2874.0 | | 2.2 | | 2.9 | 0.7 | 2.2 | 2.2 | | | | |
| Water | 1.0 | 0.7 | | | | 2.0 | | | 1323.0 | 1323.0 | 668.0 | | 9.0 | 677.0 | 2802.0 | | 0.2 | 2802.0 | | 40 | Tr. | 4.0 | 1.5 | 3.0 | | 126.0 | 287.0 | 427.0 | 583.0 | 583.0 | 266.6 | | 266.6 | 266.6 | |
| Sodium Hydroxide | | | | | | | | | | | 127.0 | | 205.0 | 125.0 | 1.2 | 124.5 | | | | | | | | | | 124.5 | | | | | | | | | |
| Sodium Nitro Methane | | | | | | | | | | | 29.0 | | 29.0 | | 0.3 | 28.7 | | | | | | | | | | 28.7 | | | | | | | | | |
| Sodium Chloride | | | | | | | | | | | 98.0 | | 100.0 | | 1.0 | 99.0 | | | | | | | | | | 53.0 | | 212.0 | 212.0 | | | | | | |
| Sodium Aluminate | | | | | | | | | | | 13.0 | | 13.0 | | 0.2 | 13.5 | | | | | | | | | | 13.5 | | | | | | | | | |
| Nitrogen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Al(OH) ₃ | | | | | | | | | | | | | | | | | | | | | | | | | | | | 13.0 | 13.0 | | | | | | |
| Filter Aid | | | | | | | | | | | | | | | 3.3 | 3.3 | | | | | | | | | | | | | | | | | | | |
| Total (LB/HR) | 2835.0 | 1451.7 | 2114.0 | 21.0 | 22.0 | 5877.0 | 569.3 | 25.3 | 1323.0 | 1323.0 | 3077.0 | 6663.0 | 2882.0 | 3244.8 | 3.3 | 6.4 | 3212.0 | 137.3 | 6095.0 | 567.0 | 4513.0 | 3910.5 | 3.0 | 2877.0 | 128.5 | 2074.7 | 559.0 | 396.0 | 3908.7 | 293.9 | 27.3 | 266.6 | 266.6 | | |

1 contains water from leach and EB tanks

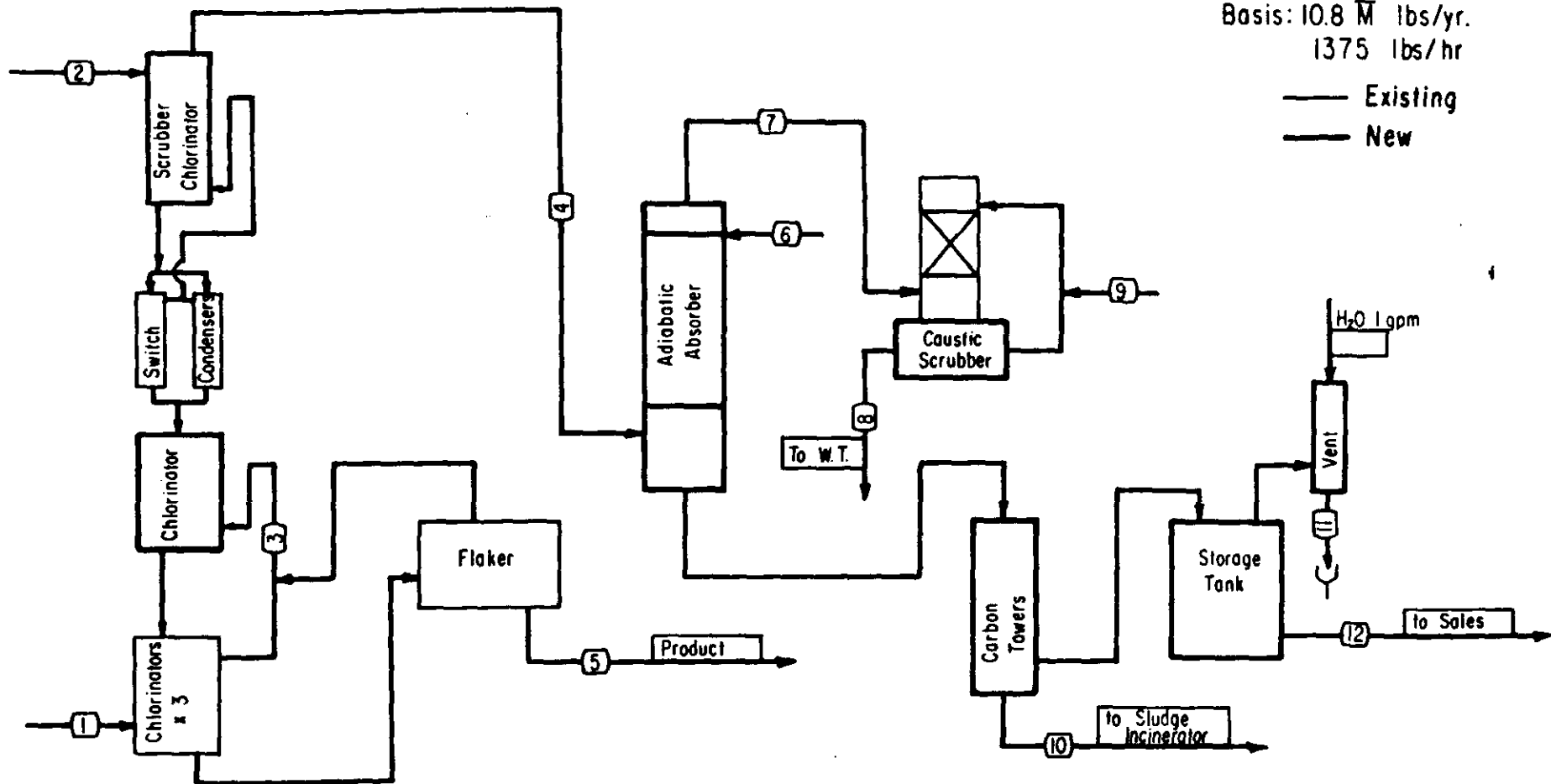
6888565 MCO

Figure 6

Tetrathal PROCESS FLOW DIAGRAM / MATERIAL BALANCE

Basis: 10.8 M lbs/yr.
1375 lbs/hr

— Existing
— New

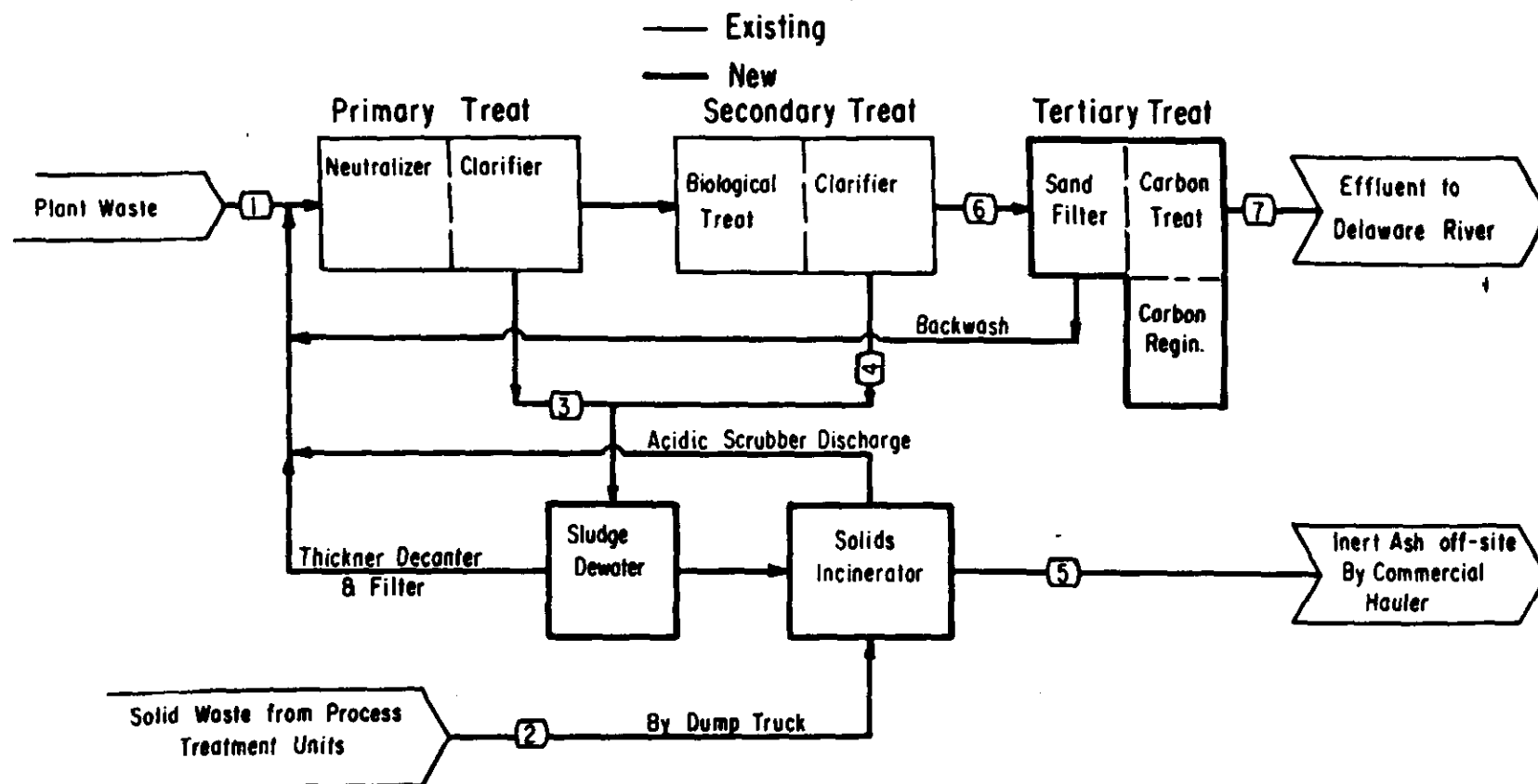


| Stream | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------------|------|-----|-------|-------|------|------|----|-------|-----|-----|------|------|
| Chlorine | 1454 | | 151.6 | 14 | | | 14 | | | | | |
| Phthalic Anhydride | | 723 | 1.3 | 0.2 | | | | | | | | |
| MoCl ₅ | | | 2.3 | | | | | | | | | |
| Tetrathal | | | 6.0 | | 1375 | | | | | | | |
| HCl | | | 648 | 790 | | | 24 | | | | Tr. | 766 |
| Phthalic Acid | | | | | | | | | | 0.2 | | |
| NaOH | | | | | | | | 8 | 50 | | | |
| Water | | | | | | 3054 | | 515 | 500 | | 500 | 2554 |
| Carbon | | | | | | | | | | 1.0 | | |
| NaCl/NaOCl | | | | | | | | 50/15 | | | | |
| Total (lb/hr) | 1454 | 723 | 809.2 | 804.2 | 1375 | 3054 | 38 | 588 | 550 | 1.2 | 500+ | 3320 |

MO 5358890

SITE SUPPORT ZERO DISCHARGE WASTE TREATMENT

Figure 7



BASIS - LBS/HR ALL DEPT'S CN STREAM

| STREAM | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | | | 7 | | |
|----------------|------|------|------|---|-----|---|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|------|------|------|------|
| Case | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Inorganics (#) | 6792 | 2052 | 6792 | | | | | | | | | | | | | 6792 | 2052 | 6792 | 6792 | 2052 | 6792 |
| Organics | 201 | 150 | 1000 | | | | | | | | | | | | | 218 | 36 | 65 | 6 | 6 | 6 |
| Average Flow | 1.5 | 0.8 | 1.0 | | | | | | | | | | | | | 1.5 | 0.8 | 1.0 | 1.5 | 0.8 | 1.0 |
| M GPD | | | | | | | | | | | | | | | | | | | | | |
| Solids | | | | | | | 667 | 170 | 667 | 417 | Some | 167 | | | | | | | | | |
| Inorganics | | | | | 253 | | | | | | | | | | | | | | | | |
| Filter Ash | | | | | 117 | | | | | | | | | | | | | | | | |
| Carbon | | | | | 24 | | | | | | | | | | | | | | | | |
| Organics | | | | | 52 | | | | | | | | | | | | | | | | |
| Ash | | | | | | | | | | | | | 217 | 410 | 167 | | | | | | |

MCO 5358891

D. Cost Estimates (Operating Costs and Capital Estimates)

1. Phthalic Anhydride
2. Benzyl Chloride
3. Santicizer 160
4. Santicizer 148
5. Santosol 100
6. Tetrathal (TCPA)
7. Tertiary Treatment
8. Sludge Disposal

MCD 5358892

Waste Treatment - Phthalic Anhydride

Basis: 100M lb/yr P.A.

Capital: See Capital Estimate and Figure

New Capital Installed \$2,400,000

Raw Materials

None

Operating Costs (1975) \$/yr

| | |
|------------------------|------------------|
| Repairs @ 8% capital | \$ 190,000 |
| Depreciation @ 10 yrs. | 240,000 |
| FIE @ 5% capital | 120,000 |
| Labor - Existing | 0 |
| Other | 60,000 |
| Fuel Oil @ 4¢/lb. | <u>1,010,000</u> |
| Total | 1,620,000 |
| Steam Sales @ 283M BTU | <u>(610,000)</u> |

Net Operating Cost \$1,010,000

MCO 5358893

Capital Estimate for 100M lb/yr Phthalic Anhydride Plant.

Off-Gas System

| | |
|--|-------------|
| Incinerator-Waste Heat Boiler and 200' Stack Installed | \$1,200,000 |
| 5000 gal. Fuel Oil Storage Tank, Unloading and Supply System Installed | 60,000 |
| Off-gas Collection Header, Steam Distillation System, Boiler Water Supply Piping | 440,000 |

\$1,700,000 \pm 30%

Liquid/Gas Incinerator

| | |
|------------------------------------|----------------|
| Installed Incinerator | 580,000 |
| Waste Gas/Liquid Collection System | <u>120,000</u> |

700,000 \pm 30%

Total

\$2,400,000

MCO 5358894

Waste Treatment - Benzyl Chloride

Basis: 100M lb/yr BzCl

Capital: See Capital Estimate and Figure

New Capital Installed \$1,300,000

Raw Materials

Filter Acid: 9000 lbs/yr

Operating Costs

| | |
|------------------------|---------------|
| Filter Acid @ 22¢/lb. | \$ 2,000 |
| Repairs @ 8% capital | 104,000 |
| Depreciation @ 10 yrs. | 130,000 |
| FIE @ 5% capital | 65,000 |
| Labor - Existing | 0 |
| Other | <u>39,000</u> |

Net Operating Costs \$ 340,000

MCO 5358895

Capital Estimate for 100M lb/yr Benzyl Chloride Plant

| | <u>Equipt. Cost</u> | <u>Installed</u> |
|---|---------------------|------------------|
| Separator System | | |
| 8000 gal. Kynar Lined Steel Tank | \$ 57.8 M | |
| Durcon Dilute Acid Recycle Pump | 2.0 | |
| Durcon Dilute Acid Recycle Pump | <u>2.0</u> | |
| Total | 61.8 | |
| Total Installed | | \$ 375,000 |
| Preseparation System | | |
| 6" Haveg SK Eductor | 7.0 | |
| 12" x 36" Corguard Cyclone | 3.0 | |
| Mix Tank 500 gal. Furan Lined | 5.0 | |
| Hastelloy C Agitator | 4.0 | |
| Filter - Pressure Leaf FRP | | |
| Precoat System | 75.0 | |
| Two Pumps - Epoxy | | |
| Cake Collection System | | |
| Total | 94.0 | |
| Total Installed | | 574,000 |
| Reactor | | |
| 10" Ø x 25' Kynar Lined Column | 7 | |
| Installed | | 42,000 |
| Water System | | |
| 6000 gal. Haveg Tank | 8 | |
| Pump Epoxy | <u>2</u> | |
| Total | 10 | |
| Total Installed | | 60,000 |
| Chlorine Gas Drying | | |
| Refrig. Vent Cond. 25 ft. ² Hast. C. | 3 | |
| 12" x 3" Corguard Cyclone | 3 | |
| Packaged Dryer System Haveg | <u>25</u> | |
| Total | 31 | |
| Total Installed | | <u>186,000</u> |
| Total | | \$1,240,000 |

MCO 5358896

Waste Treatment - Santicizer 160

Basis: 100M lb/yr S-160

Capital: See Capital Estimate and Figure

New Capital Installed \$1,800,000 ± 30%

Raw Materials:

Filter Aid 1M lbs/yr

HCl (100%) 0.5M lbs/yr

Operating Costs (1978) \$/yr.

| | |
|-------------------------|---------------|
| Filter Aid @ 22¢/lb. | \$ 220,000 |
| HCl @ 4¢/lb. | 20,000 |
| Repairs @ 8% of capital | 144,000 |
| Depreciation @ 10 yrs. | 180,000 |
| FIE @ 5% capital | 90,000 |
| Labor - Existing | 0 |
| Incineration @ 6¢/lb. | 70,000 |
| Utilities | <u>50,000</u> |

Total Operating Cost \$ 774,000

MCD 5358897

Capital Estimate for 100M lb/yr Santicizer 160 Plant

| | <u>Equip. Cost</u> | <u>Installed</u> |
|---|--------------------|------------------|
| Caustic Wash Settler | | |
| 12000 gal. CS Tank, Atm Press. | \$20M | |
| Two Pumps | <u>2</u> | |
| Total | | \$22M |
| Mixer-Settler | | |
| 2' Ø x 2.5' Long Furan Tank | 1 | |
| Hast. C Agitator | 2 | |
| 12000 gal. Furan Lined Tank | 25 | |
| Two Pumps - Epoxy | <u>6</u> | |
| Total | | 34 |
| Hydrolyzer System | | |
| 5000 gal. CS Tank - 100 psig | 20 | |
| Agitator | 3 | |
| Slurry Pump | 5 | |
| Heat Exchanger - 500 ft. ² C.S. | <u>6</u> | |
| Total | | 34 |
| Stripper System | | |
| Column: 26" Ø x 35' FV C.S. | 20 | |
| Bottom Pot: 44" x 9' FV C.S. | 8 | |
| Top Enlargement: 5' x 65' with Baffles | 16 | |
| Trays | 3 | |
| Condenser: 350 ft. ² C.S. | 4 | |
| Decanter: 2 1/2' Ø x 7' FV C.S. | 2 | |
| Pump | 1 | |
| Bottoms Cooler: 350 ft. ² , C.S. | 4 | |
| Vacuum Jets | <u>5</u> | |
| Total | | 63 |
| Filter | | |
| 150 ft. ² Rotary Precoat Vacuum Drum | 90 | |
| Filter with All Aux. | | |
| Filter Aid Tank: 3000 gal. C.S. with Agit. | 12 | |
| Filter Aid Pump | 1 | |
| Filter Feed Tank with Agit., 12000 gal. C.S. | 23 | |
| Filter Feed Pump | <u>1</u> | |
| Total | | <u>127</u> |
| | | \$280M |

Total Installed

MCO 5358898

\$1,800,000

Waste Treatment - Santicizer 148

Basis: 60M lb/yr S-148

Capital: See Capital Estimate and Figure

New Capital Installed \$3,600,000

Raw Materials

None

Operating Costs (1975) \$/yr.

| | |
|----------------------------|----------------|
| Repairs @ 8% Capital | \$ 288,000 |
| Depreciation @ 10 yrs. | 360,000 |
| FIE @ 5% Capital | 180,000 |
| Incineration @ 6¢/lb. | 238,000 |
| Labor @ \$8/hr. | 70,000 |
| Steam @ 2.83/M BTU | 25,000 |
| Electricity @ \$2.91/CKWH | 26,000 |
| Other 10% of above | <u>113,000</u> |
| Total | 1,300,000 |
| Recovered Phenol @ 30¢/lb. | <u>880,000</u> |

Net Operating Cost 420,000

MCO 5358899

Capital Estimate for 60M lb/yr Santicizer 148 Plant

See CEA 3032

MCO 5358900

Waste Treatment - Santosol 100

Basis: 1.75M lb/mo

Aqueous Waste

Capital: See Figure

New Capital Installed \$ 350,000 ± 30%

Raw Materials

Filter Aid: 26,600 lbs/yr
HCl (100%) 98,400 lbs/yr

Operating Costs

| | |
|------------------------|--------------|
| Filter Aid @ 22¢/lb. | \$ 5,900 |
| HCl @ 4¢/lb. | 3,900 |
| Repairs @ 8% Capital | 28,000 |
| Depreciation @ 10 yrs. | 35,000 |
| FIE @ 5% Capital | 17,500 |
| Incineration @ 6¢/lb. | 13,100 |
| Labor - Existing | - |
| Steam @ \$2.83/M BTU | 7,200 |
| Power @ \$2.91/CKWH | 1,000 |
| CTW @ 7¢/M gal. | <u>1,000</u> |

Total Operating Costs \$ 112,600

MCO 5358901

Waste Treatment - Santosol 100

Basis: 1.75M lb/mo. HCl Product: 2235 Ton/yr.

HCl Handling

Capital: See Figure

New Capital Installed \$1,720,000

Raw Materials

Carbon: 181,000 lb/yr

Operating Costs

| | |
|---------------------------|---------------|
| Carbon @ 6¢/lb. | \$ 11,000 |
| Repairs @ 10% Capital | 172,000 |
| Depreciation @ 10 yrs. | 172,000 |
| FIE @ 5% Capital | 86,000 |
| Labor @ \$8/hr | 23,000 |
| Electricity @ \$2.91/CKWH | 15,000 |
| Others | <u>48,000</u> |
| Total | 527,000 |

| | |
|---------------------|-----------------|
| Acid Sales @ 4¢/lb. | (179,000) |
| MAT @ 10% Sales | <u>+ 18,000</u> |

Net Operating Costs \$ 366,000

MCO 5358902

Waste Treatment - TCPA

Basis: 6 mo/yr HCl Product: 1510 tons/yr

Capital:

New Capital Installed \$2,190,000

Raw Materials:

Carbon: 4000 lb/yr
Caustic: 220000 lb/yr

Operating Costs:

| | |
|---------------------------|-----------|
| Carbon @ 6¢/lb. | \$ 0 |
| Caustic @ 5¢/lb. | 11,000 |
| Repairs @ 9% Capital | 197,000 |
| Depreciation @ 10 yrs. | 219,000 |
| FIE @ 5% Capital | 110,000 |
| Labor @ \$8/hr. | 23,000 |
| Electricity @ \$2.91/CKWH | 15,000 |
| Others | 58,000 |

Total \$633,000

| | |
|---------------------|-----------------|
| Acid Sales @ 4¢/lb. | (121,000) |
| MAT @ 10% Sales | <u>+ 12,000</u> |

Net Operating Cost \$ 524,000

Capital Estimate for TCPA Plant

Reaction Area

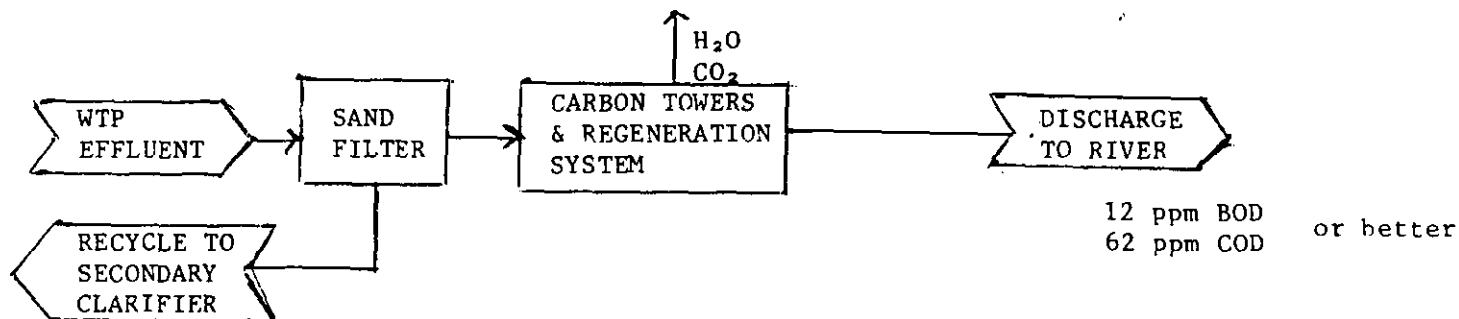
| | |
|---|-------------|
| Chlorinator: 2120 gal. Nickel, 142 ft. ² | |
| Internal Coil, Nickel Sparger | |
| Scrubbing Column: 3' ϕ x 20' high | \$1,000,000 |
| Nickel, Nickel Packing | |

Muriatic Acid Area

| | |
|--------------------------|-------------|
| Absorber System (\$676M) | |
| Carbon Treating (\$414M) | 1,190,000 |
| Reducing (\$100M) | |
| | <hr/> |
| Total Installed | \$2,190,000 |

MCO 5358904

TERTIARY TREATMENT
"ZERO" DISCHARGE WASTE TREATMENT
AT DELAWARE RIVER



| | Case 1 | Case 2 | Case 3 |
|-------------------------|--------|--------|--------|
| M GPD | 1.5 | 0.8 | 1.0 |
| Lbs. Organics/Day | 5230 | 875 | 1570 |
| Lbs. Carbon/Day | 78450 | 13125 | 23550 |
| Capital Cost, \$M | 7.8 | 3.0 | 4.2 |
| Operating Cost, \$M/yr. | 4.3 | 0.7 | 1.3 |

LBS. ORGANICS PER DAY:

WTP EFFLUENT DESIGN BASIS = 1260 ppm COD (Case 1)

ASSUME 3# COD/# ORGANICS: 1260 ppm COD = 420 PPM ORGANICS

$$\text{LBS. ORGANICS/DAY (Case 1)} = \frac{(1.5 \text{M GAL})}{(\text{DAY})} \frac{(8.3\#)}{(\text{GAL.})} \frac{(420)}{(1\text{M})} = 5230$$

$$\text{Case 2} = .167 \times \text{Case 1}; \text{Case 3} = .30 \times \text{Case 1}$$

LBS. CARBON PER DAY:

$$\text{Carbon Usage} = 1\# / 0.2\# \text{ COD} = 1\# / .067\# \text{ ORGANICS}$$

CAPITAL COST:

BASIS: LAKE TAHOE EXAMPLE FROM
EPA CARBON ABSORPTION
PROCESS DESIGN MANUAL

$$\text{Absorption: } \$2.67\text{M} \left(\frac{\text{M GPD}}{7.75\text{M GPD}} \right)^{.6}$$

$$\text{Regeneration: } \$0.98\text{M} \left(\frac{\text{Carbon Usage}}{3000\#/\text{day}} \right)^{.6}$$

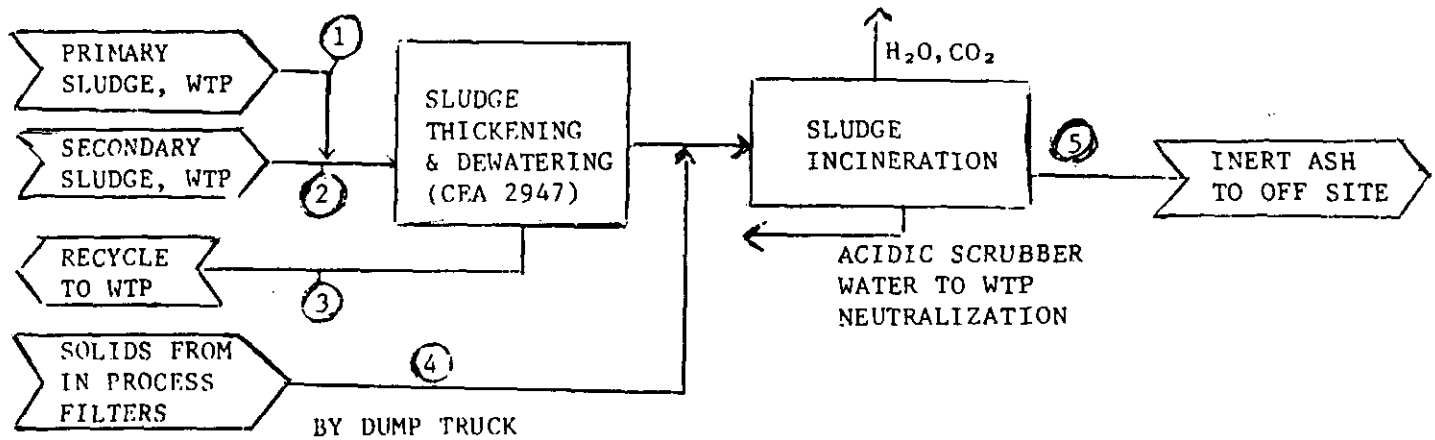
OPERATING COST:

BASIS: 15¢/# Carbon

MCO 5358905

SLUDGE DISPOSAL
"ZERO" DISCHARGE WASTE TREATMENT
AT DELAWARE RIVER

- 44 -



Case 1

| | 1 | 2 | 3 | 4 | 5 |
|---------------------|-----|-----|-----|---|-----|
| Average GPM | 134 | 84 | 208 | | |
| Solids, lbs/hr | 667 | 417 | 51 | | 217 |
| Organics, lbs/hr | | | | | |
| Filter Aid, lb/hr | | | | | |
| Carbon | | | | | |
| Total, lbs/hr Waste | 667 | 417 | 51 | | 217 |

Case 2

| | 1 | 2 | 3 | 4 | 5 |
|---------------------|-----|---|---|-----|-----|
| Average GPM | 35 | | | | |
| Solids, lbs/hr | 170 | | | 250 | 410 |
| Organics, lbs/hr | | | | 58 | |
| Filter Aid, lb/hr | | | | 120 | |
| Carbon | | | | 51 | |
| Total, lbs/hr Waste | 170 | | | 479 | 410 |

Biological Treat. Not Used

Case 3

| | 1 | 2 | 3 | 4 | 5 |
|---------------------|-----|-----|---|---|-----|
| Average GPM | 134 | 35 | | | |
| Solids, lbs/hr | 667 | 167 | | 2 | 167 |
| Organics, lbs/hr | | | | | |
| Filter Aid, lb/hr | | | | | |
| Carbon | | | | | |
| Total, lbs/hr Waste | 667 | 167 | | 2 | 167 |

MCO 5358906

\$M

Capital

| | 1 | 2 | 3 |
|---------------------------------------|-----|-----|-----|
| Sludge Thickening, Dewatering Lagoons | 4.0 | 1.3 | 3.4 |
| Incineration | 2.0 | 1.5 | 1.7 |
| Total | 6.0 | 2.8 | 5.1 |

Operating Cost

| | 1 | 2 | 3 |
|---------------------------------------|------|------|------|
| Repair, Depr., & FIE (23% of Capital) | 1.38 | 0.65 | 1.17 |
| Fuel Oil @ 4¢/# | 0.35 | 0.19 | 0.30 |
| Ash Disposal @ 5¢/# | 0.10 | 0.18 | 0.08 |
| Other | 0.10 | 0.10 | 0.10 |
| Total | 1.83 | 1.12 | 1.65 |

E. Energy Utilization

The major energy requirements were estimated for each of the three cases. Electrical power, steam and fuel oil need were calculated individually. For Cases 2 and 3, which included the waste heat boiler in phthalic anhydride, the steam available for plant use was estimated and shown as a by-product credit both in MM BTU and equivalent gallons of fuel oil. Net energy requirements were then determined. These values are all listed in Table 3.

Table 3

Zero Discharge - Energy Requirements

| <u>Annual Usages</u> | <u>Case</u> | | |
|--------------------------|-------------|----------|----------|
| | <u>1</u> | <u>2</u> | <u>3</u> |
| Fuel Oil - M gal. | 1.1 | 3.75 | 4.09 |
| Steam MM BTU | NE | 11.4 | 8.8 |
| Electricity M KWH | NE | 3.7 | .9 |
| <u>By-Product Credit</u> | | | |
| Steam MM BTU | | 215 | 215 |
| Fuel Oil M gal. | | 2.17 | 2.2 |
| <u>Net Usage</u> | | | |
| Fuel Oil - M gal. | 1.1 | 1.58 | 1.89 |
| Electricity M KWH | NE | 3.7 | 0.9 |

NE = Not Estimated

From Table 3 it can be concluded that zero discharge will require additional energy resources. However, present plant support facilities would not require expansions to meet these demands. In fact, the phthalic anhydride waste heat boiler would idle some existing capacity in the plant boilers.

The power requirements would increase total plant electrical demand by approximately 2.5% and 10% for Cases 3 and 2 respectively. Plant fuel oil requirements would increase approximately 40%, 60% and 70% for Cases 1, 2 and 3 respectively. All increases are over 1975 actual usages.

VI. APPENDIX

Definition of "Zero Discharge"

The term "zero discharge" originates from the "Declaration of Goals and Policy" of the 1972 "Federal Water Pollution Control Act" - Public Law 92-500. It declares: "it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985". "Discharge of pollutants" is defined as meaning "any addition of any pollutant to navigable waters from any point source". The term "pollutant" is not well defined in the law - it merely lists many possible pollutants including chemical wastes. "Pollution" is, however, defined in Regulation 40 CFR 401 as "man-made or man induced alteration of the chemical, physical, biological and radiological integrity of water".

Applying the above definition to Delaware River and following discussions with numerous people including Federal EPA officials, here is how we interpret zero discharge:

1. Because the Delaware River is saline at our discharge point, discharge of Na^+ , K^+ , Ca^{++} , Mg^{++} , Cl^- or SO_4^{--} does not "violate the integrity" of the water and therefore cannot be considered to be pollution.
2. BOD and COD values for discharge must not exceed the levels in our well water supply, 12 mg/l and 62 mg/l, respectively.
3. Other parameters and limits (mostly as derived from quality of our well water):

| | |
|--------------------------|--|
| Phenol - | zero (or lower than detection limit of 0.001-0.002 mg/l) |
| Total Suspended Solids - | <25 mg/l |
| Ammonia - | 0.15 mg/l |
| Kjeldahl Nitrogen - | 0.21 mg/l |
| Nitrate N - | 0.13 mg/l |
| Phosphorus - | 0.11 mg/l |
| Oil and Grease - | <3 mg/l |

MCO 5358908

Heavy Metals

| | |
|---------------|--|
| Chromium - | 0.05 mg/l |
| Lead - | 0.05 |
| Silver - | 0.05 |
| pH - | 6.5 - 8.5 |
| Color - | No greater than river water (specific information not available) |
| Temperature - | <5°C variation from river temperature |

As a corollary, "zero discharge" would also involve reduction of air pollutants to an undetectable (by observation) level including absence of steam plumes from process areas as well as absence of odor outside plant boundaries.

Any solid wastes generated will have to be destroyed in a manner that does not contribute to degradation of the environment. Acceptable methods would include incineration, burial of innocuous materials which degrade readily and landfill of other more objectionable wastes provided complete leachate collection and treatment is practiced.

MCO 5358909

VII. REFERENCES

1. "Zero Discharge Waste Treatment at Delaware River" Cost Estimate
Report issued by E. D. Clemons, January 13, 1976.

MCO 5358910

Monsanto

FROM (NAME & LOCATION)

Mike Pierle - Delaware River Plant

DATE

April 26, 1974

cc P. B. Hodges ELSF
D. B. Hosmer ELSF
G. F. Knollmeyer
P. R. Parker

SUBJECT

Plant NPDES Permit

REFERENCE

TO : H. F. Ray

On 4/24/74 I concluded a series of informal discussions with James Reidy, EPA with respect to his preparation of a draft NPDES permit for the plant. The discussions were, essentially, an extension of previous discussions and meetings (1971-1974) concerning permit conditions.

At this time my best estimate of permit's effluent limitation are:

Current Discharge (Issuance of permit to treatment plant startup)

| Parameter | Daily Discharge | |
|---------------------|-----------------|------------------|
| | Avg. (1) | Max. (2) |
| THOMPSON COBURN LLP | | |
| pH | Range: 1 to 12 | |
| Temp. | | 110° |
| TSS | 18000 lbs. | 53000 lbs. |
| NH ₃ -N | 75 lbs. | 300 lbs. |
| TKN | 375 lbs. | 1000 lbs. |
| Color | 800 color units | 2000 color units |
| TOC | 16500 lbs. | 28000 lbs. |
| BOD ₅ | 24000 lbs. | 37000 lbs. |
| Total Cr. | 60 lbs. | 100 lbs. |
| O&G | 4700 lbs. | 11200 lbs. |
| Phenol | 2200 lbs. | 4100 lbs. |

*Delaware River
1974 → briefly
discussed →
waste.*

Attorneys at Law

(1) Avg. of samples in 30-day period (2) Max. 24 hr. comp.

Final Discharge

| Parameter | Daily Discharge | |
|------------------|-------------------|-------------------|
| | Avg. | Max. |
| pH | Range: 6-9 | |
| Temp | | 110°F |
| TSS | 1250 lbs. | 2065 lbs. |
| BOD ₅ | 2200 or 2400 lbs. | 3675 or 4000 lbs. |
| TOC(1) | 4800 lbs. | 8000 lbs. |
| O&G | 125 lbs. | 190 lbs. |
| TKN | 375 lbs. | 1000 lbs. |
| Total-CR(2) | 6.5 lbs. | 13 lbs. |
| Phenol(2) | 23 lbs. | 46 lbs. |

MCO 5357658

- (1) N. J. has stated to EPA that DRBC Resolution 72-1 requirements must be included in permit on basis that they are required for "Water Quality" maintenance. Thus, O&G limit of 10 mg/l applies. Reidy agrees with our viewpoint on the O&G test (filtration vs. extraction) and suggests that our written comments on draft permit reflect this. Incidentally, the State views the values in Resolution 72-1 as instantaneous maximums.
- (2) The permit will state that if the limits are not achieved at the end of the demonstration period (11/75), EPA will set a compliance schedule to achieve limits no later than June 30, 1977.

Monitoring

DRBC on 4/23/74 requested EPA to include

BOD₂₀, NH₃-N, NO₂, and NO₃ monitoring in the permit to allow them to assess Nitrogenous Oxygen Demand reduction requirements. EPA has not established its position.

The sampling schedule frequency for "Current" and "Final" data reporting will be reduced over that in G. F. Knollmeyer's 12/11/72 letter.

Based on the above our problem areas are

O&G, phenol and possibly TSS and chromium. O&G will be attacked in our comments on the draft permit, whereas phenol, TSS and chromium would confront us after startup. As forward planning I would recommend the following work:

1. Generate comparison data on the two O&G methods for further discussions with EPA, DRBC and NJ. (If "Water Quality" basis holds then our arguments would be against NJ and DRBC. This could force public hearing or adjudacatory hearing with EPA as bystander). Lab - 6/74.
2. Prepare technical and economic evaluation for phenol removal at 90%, 99%, 99⁰% via in-plant treatment. Responsibility and timing to be determined by 5/31/74.
3. Obtain 30 days data on Chromium removal from effluent via precipitation and sedimentation. TSD-Lab. 6/74.
4. Restart field bio-unit to measure phenol removal efficiencies and effects of shock loading. TSD 7/74.

MCO 5357659

Plant NPDES Permit
Page 3
April 26, 1974

In addition, provisions for raising the allowable final limits necessitated by manufacturing expansions or additions will not be included. When the need exists, the plant will have to request a change from EPA.

Mike
Mike Pierle

/brs

MCO 5357660

ENVIRONMENTAL PROTECTION AGENCY

Region II Office
26 Federal Plaza
New York, New York 10007

August 31, 1972

Mr. George Knollmeyer
Plant Manager
Monsanto Company
Bridgeport, New Jersey 08014

Dear Mr. Knollmeyer:

The Enforcement Division of the United States Environmental Protection Agency, Region II, has thoroughly reviewed the waste water pollution situation at Monsanto's Bridgeport plant. We have held three meetings with representatives of Monsanto on January 11, 1972, January 28, 1972, and March 20, 1972, and are in receipt of the outline of your preliminary plans for abatement.

Since the Gloucester County regional industrial waste treatment system is no longer a possibility, Monsanto must move forward as quickly as possible toward the unilateral abatement of its pollution problems. Enclosed please find a set of Abatement Conditions for your Bridgeport plant developed by EPA.

1st. Oct. ←
earliest

We would appreciate your immediate attention to these Abatement Conditions, and suggest a meeting in our office during the week of September 19-22, 1972, for the final acceptance by both parties of the relief package. At this meeting, we expect Monsanto to submit a commitment letter, embodying all the terms of the Abatement Conditions and signed by an appropriate corporate official of the rank of vice president or above. If a letter committing the company to all the provisions of EPA's Abatement Conditions is not to be forthcoming, we expect a written response from an appropriate corporate official detailing the specific provisions to which the company is unwilling to commit itself and the economic, technical, social or physical reasons for its decision.

Please contact either Mr. Coles Phinzy or Mr. Robert Denham of our office at 212-264-9880 to arrange the exact time of our meeting, or if there are any problems with these arrangements.

MCO 5357661

Thank you very much for your continued cooperation on our mutual efforts to protect and improve the Delaware River Basin. We look forward to hearing from you as soon as possible.

Sincerely,
GUS J. BENNETT
Director
Enforcement Division

Coles H. Phinzy, Jr.
Attorney
Enforcement Division

Enclosure

cc: Mr. Charles M. Pike
New Jersey State Dept. of
Environmental Protection
P.O. Box 1390
Trenton, N.J. 08625

Mr. James F. Wright
Executive Director
Delaware River Basin Commission
P.O. Box 360
Trenton, N.J. 08603

Mr. John Winkler
Engineering Superintendent
Monsanto Company
Bridgeport, N.J. 08014

Mr. Michael Pierle ✓
Engineering Specialist
Monsanto Company
Bridgeport, New Jersey 08014

MCD 5357662

Monsanto Company
Bridgeport, New Jersey

Certain values reported by Monsanto in its Refuse Act Permit Application indicate that additional treatment and/or in-plant changes will be necessary to enable the plant's discharge to achieve acceptable effluent levels. The following Abatement Conditions specify limits which will apply to the plant's discharges. Abatement Condition 1 specifies limits which apply immediately. These limits reflect values reported in the Refuse Act Permit Application or limits with which the applicant can readily comply. The limits in Abatement Condition 1 do not necessarily indicate acceptable discharge values, but rather, permissible limits which are applicable on a temporary basis. For those parameters in which this is the case, Abatement Conditions 2 and 3 provide future limits and implementation schedules with which Monsanto must comply. Monsanto should note that Abatement Condition 3 requires complete compliance with all the limits specified in Abatement Condition 2 by August 1975.

ABATEMENT CONDITIONS

1. Except as specified otherwise in (1c) below, Monsanto is authorized to discharge a final effluent which shall not exceed the average daily and maximum daily values as reported on the application including any modifications thereto.

(a) OIL & GREASE: The discharge shall not contain concentrations of oil and grease that would produce a sheen in the receiving waters nor shall oil be discharged in any quantities that are harmful as defined pursuant to 40 CFR 110.

(b) FLOATING SOLIDS: The effluent shall not contain any visible foam or floating solids.

(c) Immediately, Monsanto is authorized to discharge an effluent whose characteristics shall not exceed the values listed below:

| Discharge Serial Number | Parameter | Daily Discharge | |
|----------------------------|----------------------|--------------------|--------------------------------------|
| | | Average | Maximum |
| 001 | pH | Range: 1.0 - 12.0 | OK |
| | Temperature (winter) | 79°F | 81°F - Only have 2 or 3 pieces of 11 |
| | Temperature (summer) | 105°F | 110°F |
| | BOD5 | 22,000 lbs | 37,000 lbs |
| | TSS | 18,000 lbs | 53,000 lbs |
| | Ammonia | 6 mg/l, 75 lbs | 23 mg/l, 300 lbs |
| | Kjeldahl N | 13 mg/l, 160 lbs | 52 mg/l, 700 lbs |
| | Color | 800 Color Units | 2000 Color Units - |
| | TOC | 10,000 lbs | 28,000 lbs |
| | Chromium | 2 mg/l, 25 lbs. | 3 mg/l, 40 lbs |
| | Oil & Grease | 61 mg/l, 740 lbs | 114 mg/l, 1500 lbs |
| | Phenols | 165 mg/l, 2000 lbs | 210 mg/l, 2500 lbs |
| | Cl-hydrocarbons | 2.4 mg/l, 30 lbs | 2.9 mg/l, 35 lbs |
| | Surfactants | 6.2 mg/l, 75 lbs | 16 mg/l, 200 lbs |

MCO 5357663

ABATEMENT CONDITIONS

Monsanto Company
Bridgeport, N.J.

Page 2

2. After the date specified in the implementation schedule, Monsanto is authorized to discharge an effluent whose characteristics shall not exceed the values listed below:

| Discharge Serial Number | Parameter | Daily Discharge | |
|----------------------------|------------------|---|------------------|
| | | Average | Maximum |
| 001 | pH | Range: 6.5 - 8.5 | OK |
| | Temperature | Not to exceed the surface T by more than 20°F and always less than 90°F | |
| | BOD ₅ | 2200 lbs | 3700 lbs |
| | TSS | 300 lbs | 600 lbs |
| | Ammonia | 75 lbs | 100 lbs |
| | Kjeldahl N | 160 lbs | 210 lbs |
| | Color | 50 Color Units | 100 Color Units |
| | TOC | 1000 lbs | 2800 lbs |
| | Chromium | 1.3 lbs | 2 lbs |
| | Oil & Grease | 5 mg/l, 60 lbs | 10 mg/l, 120 lbs |
| | Phenols | .02 mg/l, .25 lbs | .5 lbs |
| | Cl-Hydrocarbons | Virtual elimination | |
| | Surfactants | 1 mg/l, 12 lbs | 30 lbs |
| | | | |

is 90°F Max
River H₂O Temp
(Depends on low
about 32,000 m
26 ppm (anywhere
at maximum
low)
90% removed 33%

3. Monsanto shall comply with the implementation schedule listed below. Monsanto shall report to both the Regional Administrator and the State Agency within 10 days following each date on the Implementation Schedule detailing its compliance with the schedule and event. The Implementation Schedule is as follows:

- | | |
|--------------------------------------|------------------|
| (a) Submission of engineer's report | June 30, 1973 |
| (b) Submission of construction plans | January 31, 1974 |
| (c) Start construction | July 31, 1974 |
| (d) Complete construction | July 31, 1975 |
| (e) Commence Operation | August 31, 1975 |

4. Collected screenings, sludges, and other solids shall be disposed of in such a manner as to prevent entry of such materials into navigable waters or their tributaries. Monsanto shall report on all effluent screenings, sludges and other solids associated with the discharge herein authorized. The following data shall be reported together with the monitoring data required in Abatement Condition 9:

This refers
to solids
from effluent
water treatment only

MCO 5357664

- (a) Sources of solids to be disposed;
- (b) Approximate volumes and weights of the materials disposed;
- (c) Method by which solids were removed and transported;
- (d) The final disposal locations of the materials.

5. Any air emissions containing waste gases and particulate matter from existing or future waste treatment facilities associated with the discharge herein authorized shall not exceed the permissible levels specified in Federal and State Air Quality Standards.

6. Any accumulated storm waters from the plant grounds which have come into contact with raw materials, chemicals, oils, contaminants, impurities, or other materials normally not present in storm water runoff shall not be discharged into navigable waters or their tributaries without prior treatment and required authorization.

7. Monsanto shall not discharge any parameters it has indicated absent in its permit application. In the event there is a change in plant operations which would result in the discharge of a parameter which was indicated as absent, then Monsanto shall notify the Regional Administrator and the State Agency prior to discharge of such material.

8. In the event Monsanto is unable to comply with any of these Conditions due to breakdown of equipment, accidents, or other causes, Monsanto shall notify the Regional Administrator and the State Agency immediately by telephone and in writing. The written notification shall include pertinent information explaining the reasons for the non-compliance and shall indicate what steps are being taken to correct the problem and to prevent the problem from recurring.

9. Monsanto shall, by July 31, 1975, provide an alternate source of electric power to operate all waste treatment facilities, or indicate in writing to the Regional Administrator that production shall be controlled or the discharge shall be handled in such a manner so that, in the event the primary source of electric power to the waste treatment facilities fails, any discharge into the receiving waters will comply with the limits set herein. This alternate power supply, whether from a generating unit located at the plant site or purchased from an independent producer of electricity, must be separate from the existing power source used to operate the waste treatment facilities. If a

separate facility located at the plant site is to be used, Monsanto shall certify in writing to the Regional Administrator and to the State Agency when the facility is completed and prepared to generate power.

10. Monsanto shall comply with the following conditions with regard to the discharge bypass of waste treatment facilities:

(a) Acceptable Bypass - A bypass of waste treatment facilities is permissible in those instances where the discharge is composed of receiving stream water not used in the production process in any manner, including cooling, nor used within the plant site for carriage of sanitary wastes generated in the plant. Water which has been obtained from a source more contaminated than the stream into which the effluent will be discharged must be treated and a bypass is not permissible.

(b) Elimination of Bypass - An Implementation Schedule for eliminating any bypass of the waste treatment plant, which would allow the entry of untreated or partially treated wastes to receiving waters, shall be submitted within 90 days to the Regional Administrator. Until such bypass is eliminated, the conditions specified in (c) below must be met.

(c) Bypass Justified - Monsanto shall, within 2 months, install flow measuring instruments equipped with continuous recorders on all waste treatment plant bypass lines and shall periodically test and calibrate such instruments and recorders to insure their good working order. When installation of these instruments is completed, Monsanto shall so certify to the Regional Administrator and the State Agency and shall begin transmitting at the frequency outlined in Abatement Condition 11 copies of all instrument test certifications as well as summaries of quantities discharged, reasons for discharge, and estimated contents of the discharge from these bypass lines.

11. Monsanto shall monitor and record the quantitative values of each discharge according to the following schedule and other provisions:

(a) Sampling Schedule*

| <u>Discharge Serial No.</u> | <u>Parameter</u> | <u>Minimum Freq. of Analysis</u> | <u>Sample Type</u> |
|---------------------------------|------------------------------|--------------------------------------|------------------------|
| 001 | Flow | continuous | |
| | pH | continuous | |
| | Temperature | Weekly | |
| | BOD ₅ | Daily | 24-hr composite |
| | TSS | Daily | 24-hr composite |
| | Ammonia | Weekly | 24-hr composite |
| | Kjeldahl N | Weekly | 24-hr composite |
| | Color | Daily | Grab |
| | TOC | Daily | 24-hr composite |
| | Chromium | Weekly | 24-hr composite |
| | Oil & Grease | Daily | 24-hr composite |
| | Phenols | Daily | 24-hr composite |
| | Chlorinated- Hydrocarbons | Weekly | 24-hr composite |
| | Surfactants | Weekly | 24-hr composite |

*Subject to change based on the results

(b) Quality Control

Adequate care should be maintained in obtaining, recording, and reporting the required data on effluent quality and quantity, so that the precision and accuracy of the data will be equal to or better than that achieved by the prescribed standard analytical procedures.

Monsanto shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at sufficiently frequent intervals to ensure accuracy of measurements.

Sampling shall be representative of the volume and quality of effluent discharge over the sampling and reporting period.

(c) Recording

Monsanto shall record the results of all required analyses and measurements and shall record, for all samples, the date and time of sampling, the sample method used, the dates analyses were performed, who performed the sampling and analyses, and the results of such analyses.

All records shall be retained for a minimum of 3 years, such a period to be extended during the course of any unresolved litigation or when so requested by the Regional Administrator. Monsanto also shall retain all original strip-chart recordings from any continuous monitoring instrumentation and any calibration and maintenance records for a minimum of 3 years, such period to be extended during the course of any unresolved litigation or when so requested by the Regional Administrator.

Monsanto shall provide the above records and shall demonstrate the adequacy of the flow measuring and sampling methods upon request of the Environmental Protection Agency's regional representative. Monsanto shall identify the effluent sampling point used for each discharge pipe.

(d) Sampling and Analysis

The analytical and sampling methods used must conform to the following reference methods (latest editions) or equivalents previously approved by EPA:

Standard Methods for the Examination of Water and Wastewaters, 13th Edition, 1971 American Public Health Association, New York, New York 10010.

A.S.T.M. Standards, Part 23, Water; Atmospheric Analysis, 1970, American Society for Testing and Materials, Philadelphia, Pennsylvania 19103.

W.Q.O. Methods for Chemical Analysis of Water and Wastes, April 1971, Environmental Protection Agency, Water Quality Office, Analytical Quality Control Laboratory, 1014 Broadway, Cincinnati, Ohio 54202.

(e) Reporting

The results of the above monitoring requirements shall be reported in the specified units. A report should be submitted even if no discharge occurred during the reporting period. A report should also be submitted if there have been any modifications in the waste collection, treatment, and disposal facilities, changes in operations procedures, or other significant activities which alter the quality and quantity of the discharges or otherwise concern these Conditions. Permanent elimination of a discharge should be brought to the attention of the Environmental Protection Agency by a special written notification.

All reports shall be signed by the principal executive officer or corporate official of at least the level of vice president, or by his agent if accompanied by a signed delegation of authority. In the case of a partnership or a sole proprietorship the reports must be signed by a general partner or the proprietor. Monsanto shall include in this report any previously approved non-standard analytical methods used. Copies of the report, properly signed, shall be sent to both the Regional Administrator and the State Agency on the tenth of each month reporting the results of the previous month.

(f) Other Requirements

Monsanto shall comply with all monitoring, recording, and reporting requirements of the State in which the discharge occurs.

Monsanto shall transmit to the Regional Administrator a duplicate copy of any reports on radioactive liquid releases required to be submitted to the Atomic Energy Commission.

Monsanto shall transmit to the Regional Administrator a duplicate copy of any reports on pesticides required to be submitted to the U.S. Department of Agriculture.

Definitions

Regional Administrator: Regional Administrator
Region II
Environmental Protection Agency
26 Federal Plaza
New York, New York 10007
ATTN: Enforcement Division

State Agency: Director
Division of Water Resources
New Jersey Dept. of Environmental Protection
Labor and Industry Building
P.O. Box 1390
Trenton, New Jersey 08625

Grab Sample: An individual sample collected in less than 15 minutes.

Composite Sample: A combination of individual samples obtained over a specific time period. Either the volume of each individual sample is proportional to discharge flow rates or the sampling interval (for constant volume samples) is proportional to the flow rates over the time period used to produce the composite.

Daily: each normal operating day.

MCO 5357669

Weekly: every seventh day (the same day each week) and a normal operating day.

Monthly: one day each month (the same day each month) and a normal operating day. (i.e. the 2nd Tuesday of each month).

Average: the means of 20 consecutive daily samples.

Maximum: the greatest value to be discharged during any normal operating day.

Net: the difference between the poundage contained in the discharge and the poundage contained in the intake over the same period of time. (Net applies only when the intake source is other than municipal, private water supply or ground water.)

Gross: the poundage contained in the discharge. (Gross applies when the intake source is municipal, private water supply or ground water.)

Instantaneous: at any moment in time (such as a value gotten from a grab sample.)

Engineering Report: an engineering report shall contain the following information:

1. Results of wastewater flow rate measurements and wastewater constituent analyses;
2. Results of pilot plant study for selecting the most feasible and economical treatment process;
3. Consideration of operational requirements with regard to meeting the effluent quality standard;
4. Process flow diagram with material balance;
5. Process configuration, interconnecting piping and provisions for operation flexibility;
6. Process control and chemical feeding system;
7. Area for future plant expansion;
8. All mechanical and electrical equipment design requirements as to the type, size, and operating characteristics;

Final Plans and Specifications for Treatment Facilities: final plans and specifications shall be presented as detailed engineering plans and specifications for construction purposes, and shall include the following:

1. The location of the existing plant boundaries, including the area for the proposed construction or revised wastewater treatment facilities;
2. Size, location and general layout of the wastewater treatment facilities;
3. Schematic flow diagram showing the flow through the various treatment process units;
4. M & I (Mechanical and Instrumentation) flow diagram showing the control system and mechanical equipment;
5. Hydraulic profiles showing the elevation of wastewater flow through each treatment process unit, including high, mean and low water level in each unit and receiving stream;
6. Test borings and ground water elevation;
7. Detail plans, including location, dimensions and elevations of all proposed and existing wastewater treatment process units;
8. Specifications for all construction methods and materials which are not shown on the construction drawings;
9. The quality of materials, workmanship, construction materials and fabrication of the facilities;
10. The type, size, strength, operating characteristics and rating of all equipment;
11. Quality and quantity of all chemicals to be used;
12. Operating tests for the completed works and component units;
13. For facilities designed with a flow of 10 million gallons per day or greater, a Critical Path Method (C.P.M.) construction schedule;

Commitment Report
on
EPA Abatement Conditions

Delaware River Plant
Monsanto Industrial Chemicals Company
a unit of Monsanto Company
October, 1972

I. Introduction

Policy

The environmental-control policy of the Delaware River plant and Monsanto Company is this:

1. Always be concerned for the public interest.
2. Regard pollution control as part of the "cost of doing business".
3. Insure that new operations meet existing pollution regulations and are adaptable to meeting foreseeable regulations.
4. Install and operate abatement facilities on existing operations to meet existing regulations.
5. Continue to devote research and engineering funds to develop improved processes which eliminate or minimize pollution.
6. Cooperate with appropriate governmental agencies, including participation in the development of rules and regulations.
7. Maintain relations with industrial and technical organizations in programs to combat pollution.

Commitment Basis

Before committing to proposed plans, schedules, or performance requirements, we assume that such requirements would be understood by, agreed upon, and desirable for both parties. Examples where such commitment would be extremely difficult, in our opinion, include:

1. Numerical values where statistical data are lacking or questionable analytical procedures exist.
2. Performance requirements where proven technology does not exist to meet abatement conditions, or has not been applied in an engineering study to a given waste discharge.

3. Regulations where the economic impact has not been thoroughly investigated or the benefits of correction have not been practically demonstrated or understood.

Relationships

Because Monsanto has 46 manufacturing locations scattered throughout the United States, it prefers that relationships with regulatory agencies be established and maintained by the plant manager, who has executive and administrative responsibility for current environmental-control efforts at the site. In accordance with this approach, we have included a letter of delegation of authority from C. Preston Cunningham (Monsanto Vice President and Managing Director, Monsanto Industrial Chemicals Company) to the Delaware River Plant Manager.

Assistance and counsel are provided to the local manager by the company's Medical, Law, Engineering, and Public Relations departments, as well as the company Environmental Protection Department and the Governmental Affairs Committee.

MCO 5357674

II. Abatement Conditions

Parameters

(Points 1 & 2 - EPA Memo*)

In Mr. Bennett's memo (dated August 31, 1972), there was listed a set of abatement conditions to be effective immediately, and another to be effective August 31, 1975.

General Comments

Immediate Requirements

The conditions for present discharges were based on Parts A and B of our plant's Corps of Engineers' discharge permit application. Many of these values were based on a limited number of samples, as we pointed out in our application.

Until very recently, we have not actively monitored many of the parameters outlined in the EPA memo. The reasons are that we participated in the Delaware River Basin Commission pilot program, and were committed to the Gloucester County Sewerage Authority program. In following these programs, there was no necessity for extensive monitoring of the EPA parameters.

Both of the above projects have now been abandoned by the DRBC and GCSA. We have therefore undertaken our own pilot plant program, and have included in it the monitoring of all EPA parameters. This monitoring will be completed prior to submission of the engineering report to the Delaware River Basin Commission in June, 1973.

In discussing the proposed EPA parameters below, we have pointed out where we don't presently have sufficient data to judge our performance. In an effort to cooperate with the EPA to the fullest extent possible, we have committed to supplying information (as we gather it) in our monthly report, and to providing complete information on each parameter by a specified date.

Future Requirements

Looking at the 1975 guidelines, we do not know presently how the discharge can be treated to meet all of the proposed conditions. In some cases, we do not understand the need to meet those conditions. In others, we are uncertain whether the best

*Throughout this report, we will be making reference to the points outlined in the EPA memo. The memo we're referring to is one dated August 31, 1972, from Mr. Gus Bennett, EPA, Region II Office.

practicable technology applied to a complex chemical facility like ours would reach the requirements. In our pilot program, we will be experimenting with (1) primary and biological treatment techniques, (2) primary, secondary, and carbon adsorption, and (3) physico-chemical processes.

We expect that information gained from this program will help us resolve some of our uncertainties and determine what is the best practicable technology, as tempered by the cost dimension, to control our plant's effluents. We also hope that this report will improve understanding between the EPA and our plant concerning the 1975 requirements and their implications. Finally, we expect that the 1975 guidelines (once mutual agreement is reached and they are achieved) will represent attainment of "best practicable technology" for the Delaware River plant until at least 1983.

Specific Comments

We felt the best way to express our opinion was to comment - parameter by parameter - on our current status, plans, programs, and ability for commitment. We have done this for both the immediate, or "present", proposals, and for the requirements to become effective in 1975.

1. pH

Present: We commit to the minimum and maximum daily discharge limits.

1975: We commit to the minimum and maximum daily discharge limits.

2. Temperature

Present: We commit to a maximum temperature of 110°F during summer months. We will collect information during winter conditions, and will have sufficient data to judge our performance by March 31, 1973. Our progress in this effort will be contained in our monthly report.

1975: We are confused by the requirements. First, we assume that the limitations are based on water surface temperatures, not air surface temperatures. Data ⁽¹⁾ indicate that Delaware River temperatures get as low as 35°F. Since we would not be able to exceed the temperature by more than 20°F (i.e., 55° or less), and since

Mining Zone

to be developed by

EPA & DRBC

biological activity is halved for each 10°F drop in temperature ⁽²⁾, we see a potential conflict with the BOD₅ requirement. We don't think the BOD requirement could be met with a biomass whose activity is one half or one fourth what it is in warm-weather surface temperatures.

{ Instead of the 90°F maximum temperature limitation, we would propose the Delaware River Basin Commission (DRBC) guideline of 110°F ⁽³⁾.

3. BOD₅

Present:

We are presently collecting information, and will have sufficient data to judge our overall performance by December 31, 1972. Our progress in this effort will be contained in our monthly report.

Relationship Defined: 1975:

90% removal

The DRBC has issued to our plant a First Stage Ultimate Oxygen Demand allocation of 4,390 pounds per day. To eliminate the possibility of a double standard, and because we do not have sufficient test data to determine the relationship between BOD₅ and FSUOD, we recommend the DRBC standard (4,390 pounds/day FSUOD, and zone 4 reduction percentage for BOD₅).

winter conditions

4. Total Suspended Solids

Present:

We commit to the average and maximum daily discharge limit.

1975:
Not meeting 100 mg/l
w/o cong. & precipitation

Phase I We expect to meet the DRBC guidelines of 90% removal, or 100 mg/l. We can determine if the 300 pound average - 600 pound maximum requirement is achievable only after the pilot plant testing program is completed.

sand filter

5. Ammonia and 6. Kjeldahl N

Present:

We are presently collecting information, and will have sufficient data to judge our overall performance by December 31, 1972. Our progress in this effort will be contained in our monthly report.

Commit

letter new week from Monday.

5. Ammonia and 6. Kjeldahl N (continued)

1975: In our biological treatment system, we anticipate the necessity of adding 90 to 100 mg/l of Nitrogen to maximize the biochemical reaction. But until we know how much we have to put in, we would suggest a postponement on regulating how much we can put out.

Commit

If we had to reduce nitrogen levels below what's needed for treatment, this would involve very intricate control technology. And at this time, even municipal secondary waste-treatment plants are not capable of meeting the values outlined in the memo.

7. Color

Present: We commit to the average and maximum daily discharge limit.

Not Reduced in Bio-effluent

Carbon Isotherms

1975: To our knowledge, an effluent color level of 50 color units cannot be achieved with a biological process. What is required: the activated carbon treatment, at a cost increase of 50%. (4)

Carbon Columns

set by BRBC

Phase 1 -

Phase 2 -

We don't see any economic or sociological benefits which would result from attaining a 50 color effluent. A cost increase of 50% for questionable benefits does not seem justified to us.

8. Total Organic Compounds

Present: We have very limited historical data on TOC's.

*Raise by to the
and commit
at @ 10,000 \$/day*

We have purchased a Beckman Analyzer, and will have sufficient data to judge our overall performance by March, 1973. Our progress in this effort will be contained in our monthly report.

1975: Removal of BOD and TOC is not a direct, one-to-one relationship. While the conditions are listed as 90% removal for both, we would not expect a 90% TOC removal to be achieved. After we run our pilot plant experiment, we will develop the numerical relationship between BOD and TOC removal.

Part of phase II

open ended to slow if when we can meet.

MCO 5357678

9. Chromium

Present: We commit to a 5 mg/l average requirement (as communicated to you in our memo of April 6, 1972).

1975: At the Del. River - EPA meeting of September 20, 1972, it was confirmed that the proposed average chromium discharge of 1.3 pounds per day is for total, not hexavalent, chromium. At present flow rates, this comes out to approximately 0.1 mg/l. We do not feel that best practicable technology can achieve this level of chromium removal.

We have switched all cooling towers to non-chromate corrosion inhibitors. There is only one source of chromium (a tempered water system) where a satisfactory non-chromate inhibitor has not yet been found. We have done extensive work to reduce the concentration of chromium and the water flow. A maximum 80% removal of hexavalent chromium through conventional secondary treatment (as reported by Barth⁽⁵⁾) will reduce our discharge in 1975 to 1 mg/l.

10. Oil and Grease

Present: The oil and grease test measures not only free oils, but also soluble organics that are solvent extractable. Using the Soxhlet extraction method⁽⁶⁾, which more accurately defines the amount of insoluble oil and grease, we will collect numbers during the pilot plant testing program, and develop average and maximum values to which we can commit prior to secondary treatment. Our target date for having such information is December 31, 1972.

1975: We will target meeting a requirement for oil and grease discharges of 10 mg/l (average), as determined by the Soxhlet test, or no visible oil. This is consistent with DRBC guidelines.

*no more than
10.*

11. Phenols

Present: Recent data indicates that average and maximum values of 2200 and 3000 pounds per day (respectively) are representative. We have targeted an average of 2000 pounds per day, and are taking steps to meet that target.

1975: Effluent concentrations of .02 mg/l (the proposed average) are not commonly achieved - if ever - by biological treatment systems. ⁽⁷⁾ Achieving this level at Delaware River would require a 99.99% reduction - which is not now attainable by best practicable control technology.

*point source #
vs 90% red. #
in Sec. Treatment*

We suggest that the phenol requirement use 185 mg/l as the base (of 100) against which to apply the removal efficiency demonstrated by our pilot studies. (For example, if the removal efficiency is 90%, an effluent of 18 mg/l would be allowable.)

12. Chlorinated Hydrocarbons

Present and 1975: We can commit to virtual elimination of chlorinated hydrocarbons, as long as this condition refers to non-biodegradable, ecologically unacceptable, materials. (We assume that controlling this type of chlorinated hydrocarbons is the EPA objective.) Since we do not handle any of these materials at our plant, we suggest the parameters be dropped from the list.

13. Surfactants

Present and 1975: We do not use or manufacture ABS, which the surfactant test measures. We think that the values obtained on effluent samples by the methylene blue method resulted from chlorides and/or phenols, both of which influence the standard analytical procedure for surfactants.

We therefore propose that this parameter be eliminated from effluent requirements.

Implementation Schedule (Point 3 - EPA Memo)

We are complying, and will comply, with the implementation schedule and notification requirements.

Solids Disposal (Point 4 - EPA Memo)

We will meet the requirements outlined in the memo.

Air Emission Requirements (Point 5 - EPA Memo)

To the best of our knowledge and ability, we will meet the requirements outlined in the memo.

Storm Water Runoff (Point 6 - EPA Memo)

We will meet the requirements outlined in the memo.

Discharge of Other Parameters (Point 7 - EPA Memo)

Assuming that the intent of the requirement is that the Del. River facility will not knowingly discharge any parameters not in its permit application, we will meet the requirements outlined in the memo.

Equipment Breakdown (Point 8 - EPA Memo)

We will meet the requirements outlined in the memo.

Alternate Power Source

(Point 9 - EPA Memo)

Since we receive electrical power from two separate power stations of the Atlantic City Electric Company, and since that company is connected to the Penn-Jersey power grid in case their primary electric supply source is out of operation, we feel we have adequate alternate sources of electric power.

Bypassing of Waste Treatment Facilities

(Point 10 - EPA Memo)

Since no bypass or bypass plans exist at the Del. River Plant these requirements are not applicable.

Sampling, Quality Control, Recording

(Point 11 - EPA Memo)

- A. Determining estimated flows by metered well-water usage, and pH values by composite samples, we will collect quantitative values according to your sampling schedule. In addition, we will upgrade and install continuous flow and pH monitoring instrumentation by March, 1973.

By ~~December, 1972~~ ^{March, 1973}, we will review the frequency requirements for those parameters where we are in continuous compliance, in the hope that we would be permitted to reduce sampling frequency.
- B. We will meet the requirements outlined in the memo.
- C. Because of the logistics of storing so much information, we propose that the raw data be summarized every six months, and summary documents be maintained for a three-year period.
- D. All such samples will be collected and analyzed in accordance with "Standard Methods", 13th edition.
- E. The Delaware River plant manager is the authorized representative to sign reports (as per the enclosed authorization memo).

change from
20 to 30 days Aug.

MCO 5357682

E. (continued)

We will begin filing monthly reports within 30 days following acceptance of the abatement conditions.

F. We will meet the requirements outlined in the EPA memo.

MCO 5357683

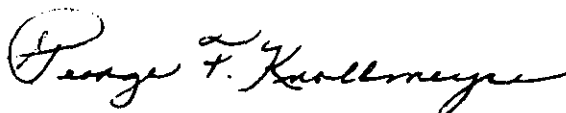
III. Conclusion

In this report, we have sincerely attempted to describe where we feel we can meet the proposed requirements, and where we have concerns as to the practicability of meeting them. We have also noted where we didn't understand the proposals, or felt they were unjustified.

Since all parameters are being monitored as part of our pilot plant treatment program, we will be in a much better position to commit ourselves as the monitoring effort provides more data.

We anticipate that approval of this commitment report will lead to approval of our Corps of Engineers' permit or its EPA equivalent.

In the meantime, we will be glad to discuss any or all of this report, at your convenience.



George Knollmeyer
Plant Manager

MCO 5357684

References

1. "Delaware Estuary Comprehensive Study", FWPCA, Washington, D. C., (1966).
2. McKinney, R. E., "Microbiology for Sanitary Engr.", McGraw Hill, New York, (1962).
3. "Basin Regulations - Water Quality", Resolution 72-1, Del. River Basin Comm., Trenton, N. J., (1972).
4. "Deepwater Pilot Plant Treatability Study", Engineering-Science Inc., Washington, D. C. (1971).
5. Barth, E. F., "Perspectives on Wastewater Treatment Processes" JWPCF 43, p.2189, (1971).
6. "Standard Methods for the Examination of Water and Wastewater", 13th Ed., Amer. Pub. Health Assn., Washington, D. C. (1971).
7. "Wastewater Treatment Technology", Patterson J. W.; et al, State of Illinois, (1971).

MCO 5357685

Monsanto

C. P. CUNNINGHAM
Managing Director
a Vice President of Monsanto

MONSANTO INDUSTRIAL
800 N. Lindbergh
St. Louis, Mo. 63103

ORIGINAL SIGNED BY PRES CUNNINGHAM AND SENT WITH REPORT

October 12, 1972

CONFIDENTIAL
ATTORNEY - CLIENT PRIVILEGE
ATTORNEY WORK PRODUCT

Mr. George F. Knollmeyer
Plant Manager
Delaware River Plant
Monsanto Company
Bridgeport, New Jersey 08014

CONFIDENTIAL
ATTORNEY - CLIENT PRIVILEGE
ATTORNEY WORK PRODUCT

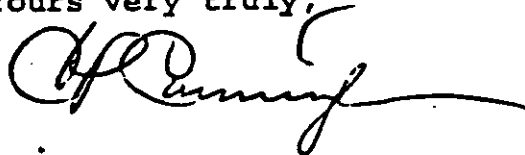
Dear Mr. Knollmeyer:

It is my understanding that from time to time the Delaware River Plant is required to:

1. Submit permit applications,
2. File amendments to pending applications, or
3. Correspond with various officials in federal, state and local government concerning pollution control activities.

This is to confirm your authority to act on behalf of Monsanto Industrial Chemicals Company in signing such documents and correspondence as they relate to the Delaware River Plant.

Yours very truly,



mw

MCO 5357686

Monsanto

ORGANIC CHEMICALS DIVISION

Monsanto Company
Bridgeport, New Jersey 08014
Phone: (609) 467-3000

December 11, 1972

Mr. Gus J. Bennett
Director, Enforcement Division
Environmental Protection Agency
26 Federal Plaza
New York, New York 10007

Dear Mr. Bennett:

In response to your request at our joint meeting on November 22, 1972 concerning Abatement Conditions at our Delaware River Plant, I have prepared the attached letter which summarizes the understanding and points of agreement reached during our discussions.

The basic commitments in the letter are:

1. Commitment to present abatement conditions as detailed in the Plant's Commitment Report of October 19, 1972. These conditions are to apply until August, 1975.
2. Commitment to provide waste treatment by August, 1975 which will meet all effluent standards presently imposed by the Delaware River Basin Commission. (Phase 1)
3. Commitment to use reasonable efforts to discharge to the Delaware River by July 1, 1977, an effluent which will meet the Guidelines for Effluent Limitations to be established under Section 304b, Title 111, of the Federal Water Pollution Control Act of October 18, 1972. (Phase 2).

MCO 5357687

Mr. Gus J. Bennett

-2-

December 11, 1972

The supplementary information on phenol removal technology will be forwarded in a separate letter by January 5, 1973.

I trust the attached letter accurately reflects the discussions at our meeting. If you desire further communication, please contact us at your convenience.

Sincerely,



George F. Knollmeyer
Plant Manager

/cmd
Encl.

MCO 5357688

Letter of Commitment

Abatement Conditions
For

MONSANTO COMPANY
Delaware River Plant

Bridgeport, New Jersey

1. Except as specified otherwise in (1c) below, Monsanto is authorized to discharge a final effluent which shall not exceed the average daily and maximum daily values as reported on the application including any modifications thereto.

(a) OIL & GREASE: The discharge shall not contain concentrations of oil and grease that would produce a sheen in the receiving waters nor shall oil be discharged in any quantities that are harmful as defined pursuant to 40 CFR 110.

(b) FLOATING SOLIDS: The effluent shall not contain any visible foam or floating solids.

(c) Immediately, Monsanto is authorized to discharge an effluent whose characteristics shall not exceed the values listed below:

| Discharge | | Daily Discharge | |
|------------|------------------|-------------------------------------|---------------------|
| Serial No. | Parameter | Average | Maximum |
| 001 | pH | Range: 1.0 — | 12.0 |
| | Temp. (Summer) | 105°F | 110°F |
| | (Winter) | Values to be determined by 3/31/73. | |
| | BOD ₅ | 22,000 lbs. | 37,000 lbs. |
| | TSS | 18,000 lbs. | 53,000 lbs. |
| | Ammonia N | 6 mg/l, 75 lbs. | 23 mg/l, 300 lbs. |
| | Kjeldahl N | 13 mg/l, 160 lbs. | 52 mg/l, 700 lbs. |
| | Color | 800 color Units | 2000 color Units |
| | TOC | 15,000 lbs. | 28,000 lbs. |
| | Chromium-Total | 5 mg/l, 60 lbs. | 8 mg/l, 100 lbs. |
| | Oil & Grease | 250 mg/l, 3000 lbs. | 500 mg/l, 6000 lbs. |
| | Phenols | 185 mg/l, 2200 lbs. | 210 mg/l, 2500 lbs. |
| | Cl-hydrocarbons | Not applicable. | |
| | Surfactants | Not applicable. | |

MCO 5357689

2. a. Phase I

After the date specified in the implementation schedule, Monsanto is authorized to discharge an effluent whose characteristics shall not exceed the values listed below.

| Discharge Serial No. | Parameter | Daily Discharge | | Remarks |
|-------------------------|--------------------|--|-------------|--|
| | | Average | Maximum | |
| 001 | pH | Range: 6.5 | 8.5 | Mixing zone requiremen will be set by EPA-DRB to determine effluent conditions. |
| | Temperature | _____ | 110°F | |
| | BOD ₅ * | 90% BOD ₅ Removal 4390 lbs. FSUOD | _____ | |
| | TSS | Lesser of 90% removal or 100 mg/l. | _____ | |
| | Ammonia-N | 75 lbs. | 100 lbs. | |
| | Kjeldahl N | 160 lbs. | 210 lbs. | |
| | Color | Level and timetable to be established with DRBC. | | |
| | TOC* | 67% Removal | 14,000 lbs. | |
| | Hexavalent | 0.1 mg/l | _____ | |
| | Chromium | 1.2 lbs. | _____ | |
| | Oil & Grease | No readily visible sheen or 10 mg/l | _____ | |
| | Phenols * | 220 lbs. | 350 lbs. | |
| | Cl-hydrocarbons | - Not applicable | | |
| | Surfactants | - Not applicable | | |

* DRBC cold weather provisions apply - 75% removal for 10 consecutive days from December through March.

2. b. Phase II

Not later than July 1, 1977, Monsanto will use reasonable efforts to meet effluent limits to be established under Section 304b, Title 111, of the Federal Water Pollution Control Act of October 18, 1972.

3. Monsanto will comply with the implementation schedule listed below. Monsanto will report to both the Regional Administrator and the State Agency within 10 days following each date on the Implementation Schedule detailing its compliance with the schedule and event. The Implementation Schedule is as follows:

- | | |
|-------------------------------------|------------------|
| a. Submission of engineer's report | June 30, 1973 |
| b. Submission of construction plans | January 31, 1974 |
| c. Start construction | July 31, 1974 |
| d. Complete construction | July 31, 1975 |
| e. Commence Operation | August 31, 1975 |

4. Collected screenings, sludges, and other solids shall be disposed of in such a manner as to prevent entry of such materials into navigable waters or their tributaries. Monsanto will report on all effluent screenings, sludges and other solids associated with the discharge herein authorized. The following data will be reported together with the monitoring data required in Abatement Condition 9:

- a. Sources of solids to be disposed;
- b. Approximate volumes and weights of the materials disposed;
- c. Method by which solids were removed and transported;
- d. The final disposal locations of the materials.

5. Any air emissions containing waste gases and particulate matter from existing or future waste treatment facilities associated with the discharge herein authorized shall not exceed the permissible levels specified in Federal and State Air Quality Standards.

6. Any accumulated storm waters from the plant grounds which have come into contact with raw materials, chemicals, oils, contaminants, impurities, or other materials normally not present in storm water runoff shall not be discharged into navigable waters or their tributaries without prior treatment and required authorization.
- which
cell permit* 7. Monsanto will not knowingly discharge any parameters it has indicated absent in its permit application. In the event there is a change in plant operations which would result in the discharge of a parameter which was indicated as absent, then Monsanto shall notify the Regional Administrator and the State Agency prior to discharge of such material.
8. In the event Monsanto is unable to comply with any of these conditions due to breakdown of equipment, accidents, or other causes, Monsanto will notify the Regional Administrator and the State Agency immediately by telephone and in writing. The written notification will include pertinent information explaining the reasons for the non-compliance and shall indicate what steps are being taken to correct the problem and to prevent the problem from recurring.
9. Since we receive electrical power from two separate power stations of the Atlantic City Electric Company, and since that Company is connected to the Penn-Jersey power grid in case their primary electric supply is out of operation, we feel we have adequate alternate sources of electric power.
10. Monsanto will comply with the following conditions with regard to the discharge bypass of waste treatment facilities:
- a. Acceptable Bypass - A bypass of waste treatment facilities is permissible in those instances where the discharge is composed of receiving stream water not used in the production process in any manner, including cooling, nor used within the plant site for carriage of sanitary wastes generated in the plant. Water which has been obtained from a source more contaminated than the stream into which the effluent will be discharged must be treated and a bypass is not permissible.

10. b. Elimination of Bypass - In the design of the 1975 waste treatment facility a bypass line will not be included.
11. Monsanto will monitor and record the quantitative values of each discharge according to the following schedule and other provisions:

a. Sampling Schedule

| <u>Discharge Serial No.</u> | <u>Parameter</u> | <u>Minimum Freq. of Analysis</u> | <u>Sample Type</u> |
|---------------------------------|------------------|--------------------------------------|------------------------|
| 001 | Flow | Continuous | |
| | pH | Continuous | |
| | Temperature | Weekly | Grab |
| | BOD ₅ | Daily | 24 hr. comp. |
| | TSS | Daily | 24 hr. comp. |
| | Ammonia | Weekly | 24 hr. comp. |
| | Kjeldahl N | Weekly | 24 hr. comp. |
| | Color | Daily | Grab |
| | TOC | Daily | 24 hr. comp. |
| | Chromium | Weekly | 24 hr. comp. |
| | Oil & Grease | Daily | 24 hr. comp. |
| | Phenols | Daily | 24 hr. comp. |
| | Chlorinated - | Not applicable | |
| | Hydrocarbons | | |
| | Surfactants | Not applicable | |

Initial flow and pH data will be determined by metering well water usage and analyzing composite samples. By March, 1973 we will upgrade and install continuous flow and pH monitoring instrumentation.

By March, 1973, we will review the frequency requirements for those parameters where we are in continuous compliance in the hope that we would be permitted to reduce sampling frequency.

b. Quality Control

Adequate care will be maintained in obtaining, recording, and reporting the required data on effluent quality and quantity, so that the precision and accuracy of the data will be equal to or better than that achieved by the prescribed standard analytical procedures.

b. Quality Control - cont'd.

Monsanto will calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at sufficiently frequent intervals to ensure accuracy of measurements.

Sampling shall be representative of the volume and quality of effluent discharge over the sampling and reporting period.

c. Recording

Monsanto will record the results of all required analyses and measurements and shall record, for all samples, the date and time of sampling, the sample method used, the dates analyses were performed, who performed the sampling and analyses, and the results of such analyses.

All monthly summary records shall be retained for a minimum of three years, such a period to be extended during the course of any unresolved litigation or when so requested by the Regional Administrator. Monsanto also shall retain all original strip-chart recordings from any continuous monitoring instrumentation and any calibration and maintenance records for a minimum of one year, such period to be extended during the course of any unresolved litigation or when so requested by the Regional Administrator.

Monsanto will provide the above records and shall demonstrate the adequacy of the flow measuring and sampling methods upon request of the Environmental Protection Agency's regional representative. Monsanto shall identify the effluent sampling point used for each discharge pipe.

MCO 5357694

d. Sampling and Analysis

The analytical and sampling methods used must conform to the following reference methods (latest editions) or equivalents previously approved by EPA:

Standard Methods for the Examination of Water and Wastewaters, 13th Edition, 1971 American Public Health Association, New York, New York 10010.

A.S.T.M. Standards, Part 23, Water; Atmospheric Analysis, 1970, American Society for Testing and Materials, Philadelphia, Pennsylvania 19103.

W.Q.O. Methods for Chemical Analysis of Water and Wastes, April 1971, Environmental Protection Agency, Water Quality Office, Analytical Quality Control Laboratory, 1014 Broadway, Cincinnati, Ohio 54202.

e. Reporting

The results of the above monitoring requirements shall be reported in the specified units. A report should be submitted even if no discharge occurred during the reporting time. A report should also be submitted if there have been any modifications in the waste collection, treatment, and disposal facilities, changes in operations procedures, or other significant activities which alter the quality and quantity of the discharges or otherwise concern these Conditions. Permanent elimination of a discharge should be brought to the attention of the Environmental Protection Agency by a special written notification.

All reports will be signed by the Plant Manager as designated by the Corporate Vice-President. Monsanto will include in this report any previously approved non-standard analytical methods used. Copies of the report, properly signed, shall be sent to both the Regional Administrator and the State Agency on the tenth of each month reporting the results of the previous month.

f. Other Requirements

Monsanto will comply with all monitoring, recording, and reporting requirements of the State in which the discharge occurs.

Monsanto will transmit to the Regional Administrator a duplicate copy of any reports on radioactive liquid releases required to be submitted to the Atomic Energy Commission.

Monsanto will transmit to the Regional Administrator a duplicate copy of any reports on pesticides required to be submitted to the U. S. Department of Agriculture.

Definitions

Regional Administrator: Regional Administrator
Region II
Environmental Protection Agency
26 Federal Plaza
New York, New York 10007

ATTN: Enforcement Division

State Agency: Director
Division of Water Resources
New Jersey Dept. of Environmental
Protection
Labor and Industry Building
P. O. Box 1390
Trenton, New Jersey 08625

Grab Sample: An individual sample collected in less than 15 minutes.

Composite Sample: A combination of individual samples obtained over a specific time period. Either the volume of each individual sample is proportional to discharge flow rates or the sampling interval (for constant volume samples) is proportional to the flow rates over the time period used to produce the composite.

Daily: each normal operating day.

Weekly: every seventh day (the same day each week) and a normal operating day.

Definitions - Cont'd.

Monthly: one day each month (the same day each month) and a normal operating day. (i.e. the 2nd Tuesday of each month.)

Average: the means of 20 consecutive daily samples.

Maximum: the greatest value to be discharged during any normal operating day.

Net: the difference between the poundage contained in the discharge and the poundage contained in the intake over the same period of time. (Net applies only when the intake source is other than municipal, private water supply or ground water.)

Gross: the poundage contained in the discharge. (Gross applies when the intake source is municipal, private water supply or ground water.)

Instantaneous: at any moment in time (such as a value gotten from a grab sample.)

Engineering Report: an engineering report shall contain the following information:

1. Results of wastewater flow rate measurements and wastewater constituent analyses;
2. Results of pilot plant study for selecting the most feasible and economical treatment process;
3. Consideration of operational requirements with regard to meeting the effluent quality standard;
4. Process flow diagram with material balance;
5. Process configuration, interconnecting piping and provisions for operation flexibility;

MCO 5357697

Definitions - Cont'd.

- ced/mr. 6. Process control and chemical feeding system;
- ced 7. Area for future plant expansion;
- ced 8. All mechanical and electrical equipment design requirements as to the type, size, and operating characteristics

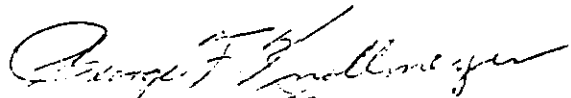
Final Plans and Specifications for Treatment Facilities:

final plans and specifications shall be presented as detailed engineering plans and specifications for construction purposes, and shall include the following:

1. The location of the existing plant boundaries, including the area for the proposed construction or revised wastewater treatment facilities;
2. Size, location and general layout of the wastewater treatment facilities;
3. Schematic flow diagram showing the flow through the various treatment process units;
4. M & I (Mechanical and Instrumentation) flow diagram showing the control system and mechanical equipment;
5. Hydraulic profiles showing the elevation of wastewater flow through each treatment process unit, including high, mean and low water level in each unit and receiving stream;
6. Test borings and ground water elevation;
7. Detail plans, including location, dimensions and elevations of all proposed and existing wastewater treatment process units;
8. Specifications for all construction methods and materials which are not shown on the construction drawings;

Final Plans and Specifications for Treatment Facilities - Cont'd.

9. The quality of materials, workmanship, construction materials and fabrication of the facilities;
10. The type, size, strength, operating characteristics and rating of all equipment;
11. Quality and quantity of all chemicals to be used;
12. Operating tests for the completed works and component units;
13. For facilities designed with a flow of 10 million gallons per day or greater, a Critical Path Method (C.P.M.) construction schedule.


George F. Knollmeyer
Plant Manager

/cmd

MCO 5357699

Monsanto

MONSANTO INDUSTRIAL CHEMICALS CO.
Bridgeport, New Jersey 08014
Phone: (609) 487-3000

October 29, 1974

Mr. James Reidy
U. S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10007

RE: NPDES Permit No. 74-952 (Draft) dated May 31, 1974
Monsanto Request for Adjudicatory Hearing June 28, 1974

Dear Jim:

As we discussed by phone, I am forwarding additional comments to you regarding the disposition of the seventeen (17) objections to the draft of the referenced permit which were attached to Monsanto's request for an adjudicatory hearing. A point by point summary is as follows:

| <u>Objection Number</u> | <u>Disposition</u> |
|-------------------------|---|
| 1 | EPA agrees. |
| 2 | EPA agrees. |
| 3 | EPA agrees but has advised that the allowance is based on current production levels and that the permit is not written for 90% removal at higher production levels. |
| 4 | EPA agrees. |
| 5 | EPA agrees except for addition of "visible sheen must be present." Monsanto will raise this question after start-up of the waste treatment plant in the event oil and grease values are greater than allowed with no visible sheen present since this is the real intent of DRBC resolution 72-1. |

Objection Number

Disposition

6

EPA disagrees completely with Monsanto's request.

Recent plant experimental data indicates that some Chromium will be removed by pH adjustment and clarification in the new waste treatment plant. Average of experimental values was 1.3 mg/l with 80% of the values less than 1.6 mg/l and a single high peak of 3.9 mg/l. The 0.5 mg/l average and 1.0 mg/l maximum proposed by EPA appears unrealistic in light of the fact that organic chemical industry BPCTCA Phase 1 guidelines have not been established. Monsanto's position is that total Chromium values should not be set in the permit until after the guidelines have been published.

7

EPA disagrees completely with Monsanto's request.

Review of the waste effluent treatability report indicates that 95% removal may be possible but not 99% (1.8 mg/l) as proposed by EPA. In another Monsanto plant which has facilities to achieve a 99% removal efficiency, capital requirements were \$1,000,000 and operating costs are \$20,000/month. The benefit to the Delaware River quality when assessed against the economic penalty makes the proposed standard appear unrealistic. Monsanto's position is that Phenol concentrations less than that which can be achieved by the new waste treatment plant should not be set until BPCTCA has been established.

MCO 5357701

Objection Number

Disposition

- | | |
|----|---|
| 8 | EPA agrees. |
| 9 | EPA agrees by stating that the new compliance schedule will go to public hearing and Monsanto will have a chance to comment at that time. |
| 10 | EPA agrees that this is normal office practice as long as the plant is not operating far out of control. |
| 11 | EPA agrees. |
| 12 | EPA agrees on dissolved oxygen request. Monsanto withdraws its objection on sampling after discussion and interpretation by EPA. |
| 13 | Monsanto withdraws its objection after discussion with EPA. |
| 14 | EPA disagrees with Monsanto's request. Estimated cost for the analyses requested is \$565/month. Monsanto's position is that use of the NPDES permit system to compel industry to provide data violates the intent of the permit program. Although Monsanto feels that arrangements for this information should be handled outside the confines of the permit, the desire to cooperate with governmental agencies to provide useful information remains intact. For this reason Monsanto requests that justification for the data be provided, a cut-off date for the analytical program be established, and that Monsanto be reimbursed by EPA for the analytical work. |

Objection Number

Disposition

15

Monsanto withdraws its objection to the EPA standard method after plant testing indicated equivalent oil and grease values could be obtained by either test. Monsanto does take this opportunity to point out that it is a widely known and established fact that there are problems associated with this test in that it does not measure oil and grease in the true sense. In the event that difficulty is encountered in meeting the oil and grease limitation after startup of the new waste treatment plant and "no visible sheen" is present in the effluent, Monsanto will request relief at that time.

16

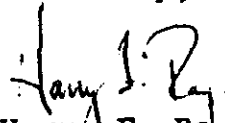
EPA agrees.

17

EPA agrees.

The preceding information should be an accurate description of where Monsanto and EPA stand in reference to Monsanto's pending NPDES permit. Should additional information be required prior to its issue in early November, please do not hesitate to call me.

Sincerely,


Harry F. Ray

Superintendent, Technical Services
Department

/cmd

bcc. GAC

MCO 5357703

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II OFFICE

SUBJECT: Final Resolution Memo on Monsanto (NJ0005045)

DATE: November 14, 1974

FROM: James Reidy, P. E. JAR 11-17-74
Industrial Water Facilities Branch

TO: Richard Baker, Chief
Status of Compliance Branch
Enforcement and Regional Counsel Division

CONFIDENTIAL
ATTORNEY-CLIENT PRIVILEGE
ATTORNEY WORK PRODUCT
11-15-74

The draft permit and public notice for the above referenced permittee resulted in two comments, one from the permittee and the other from the Delaware River Basin Commission (DRBC). The permittee in its letter of June 28 listed 17 statements or objections to the draft permit and fact sheet. Their comments and final resolutions, as determined by EPA, are as follows:

Comment:

1. The present average flow is 1.55 million gallons per day (MGD) and not 1.45 MGD as stated in the fact sheet.

Resolution: The change in flow is noted and this higher flow will be used in establishing any requirements of the permit that are based on flow.

Comment:

2. The present daily average BOD₅ value is 10,900 kg/day (24,000 lbs/day).

Resolution: The upward revision of the present allowable BOD₅ effluent discharge will be made in the permit.

Comment:

3. Change the daily average and maximum values for BOD₅ to 1090 kg/day (2,400 lbs/day) and 1820 kg/day (4,010 lbs/day), respectively.

MCO 5357704

Resolution: Since the BOD₅ removal by the proposed treatment system will be 90 per cent and since this removal rate is consistent with the expected efficiency of a secondary biological treatment system, the request will be granted. However, it should be noted that an increase in the raw waste load to the treatment plant which is not caused by facility expansions, production increases or process modifications will not necessarily increase the final effluent limitation for this parameter. In other words, the effluent limitation is in pounds per day and not a per cent reduction of the raw waste load input.

Comment:

4. Change daily average and maximum values for TOC to 2180 kg/day (4800 lbs/day) and 3490 kg/day (7680 lbs/day), respectively.

Resolution: This change will be reflected in the final permit since the requested values are consistent with the expected efficiency of secondary treatment systems.

Comment:

5. Raise daily maximum value for oil and grease to 76 kg/day (167 lbs/day) and add "visible sheen must be present."

Resolution: EPA has decided to include an allowable maximum poundage of 194 per day (88 kg/day), which equates to a concentration of 15 mg/l on the average daily wastewater flow. However, it should be noted that an instantaneous maximum effluent concentration limit of 10 mg/l, which is a DRBC limitation, is also imposed on this parameter and that a violation of the effluent concentration will be a violation of this permit, irrespective of the poundage limitation. The request for the addition of a statement in the permit that a visible sheen must be present is being rejected since this request is not consistent with regional EPA policy.

Comment:

6. Delete numerical requirement for total chromium.

Resolution: This request is being denied. The permittee employs chromium based compounds for treatment of its cooling water. It is the national policy of EPA that cooling discharges should be limited to a maximum effluent concentration of 1 mg/l for total chromium and such is being applied for this permit. The daily average effluent limitation will be deleted but the daily maximum limitation will remain in the permit.

Comment:

7. Change daily average and maximum values of phenols to 100 kg/day (220 lbs/day) and 159 kg/day (350 lbs/day), respectively.

Resolution: The permittee has submitted a letter to this office since the time of the June 28, 1974 letter which contains a commitment to remove phenols to a level of 110 lbs/day on a daily average basis and 220 lbs/day on a daily maximum basis. This poundage discharge, although more than what was proposed in the draft permit, will be accepted by this office.

Comment:

8. Change date in condition 11(b) from July 31, 1974 to July 31, 1975.

Resolution: Since the inclusion of July 31, 1974 was an administrative oversight by this office and since it was intended to specify July 31, 1975 as the date for completing construction of the wastewater treatment plant, this requested change will be reflected in the permit.

Comment:

9. A provision should be included in the permit for Monsanto's participation in setting any future compliance schedules.

Resolution: Although there will be no provision in the final permit for such participation, such a proposed schedule of compliance would be published in a draft form. This draft compliance schedule would be subject to any comments or criticisms from any interested parties. After a specified period of time, all comments or criticisms of the draft compliance schedule would be considered. This procedure would appear to meet the permittee's objection.

Comment:

10. If sampling schedule I data should indicate higher initial effluent discharge values than those allowed in the permit, these new higher values should be included in the permit as initial effluent limitations.

Resolution: This substitution is consistent with Regional policy and will be implemented upon notification of request by the permittee and submittal of supporting data for this request to this office.

Comment:

11. Utilize continuously metered water usage values in lieu of continuous discharge measurements until August, 1975.

Resolution: Such a request will be granted until the specified time. After that period, continuous flow monitoring of the wastewater discharge will be required.

Comment:

12. Remove wording on dissolve oxygen, utilize continuous sampling for oil and grease and bacteriological analysis and monitor temperature on grab sample basis until August, 1975.

Resolution: The first two requests will not be granted. Although there is no requirement on dissolve oxygen in this permit, such wording is standard phraseology that appears in all NPDES permits issued in this region. As such, it will remain in this permit. Of course, since no requirement concerning this parameter appears in the permit, no monitoring or reporting will be required by this office.

The request for continuous sampling of the two referenced parameters is not being granted since the oil and grease sampling technique is contrary to published EPA procedure (Methods for Chemical Analysis of Water and Wastes 1971, page 217) and the bacteriological sampling technique has not been supported by any documentation to prove that this technique would result in accurate readings. In addition, the requested sampling technique is contrary to national EPA policy.

The intent of the permit is that temperature should be measured on a grab sample basis until August, 1975. After that time, the effluent temperature discharge will be required to be measured continuously. The permittee's present effluent temperature is already near the maximum allowable effluent discharge and this office believes that continuous monitoring is necessary to insure that a thermal violation does not occur.

Comment:

13. Eliminate Kjeldahl Nitrogen monitoring requirements.

Resolution: This monitoring requirement is being imposed since this parameter is limited in Condition 9(c) of the permit and, as such, is also limited in Condition 10 of the permit. The request will not be granted.

Comment:

14. Eliminate the requirement of the permittee to sample on a weekly basis for the nitrogen series parameters and on a monthly basis for BOD with recordings of BOD readings at specified periods.

Resolution: According to an internal EPA policy decision, it has been decided to request sampling for the entire nitrogen series and for BOD at specific periods for all municipal facilities greater than 1.0 MGD design capacity and for known industrial carbonaceous and nitrogenous sources located along the Delaware Estuary. Monsanto's plant at Bridgeport has been identified as such a source. At this time, EPA cannot estimate the duration of these sampling requirements. However, a review of the need for such data will be made in the future and, if deemed desirable, the sampling requirements could be curtailed or eliminated.

Comment:

15. Substitute "Standard Methods" procedure for grease for the standard EPA test procedure for oil and grease.

Resolution: Telephonic communication between the permittee and this office since the time of the above referenced letter has indicated that there is no significant difference in the amount of oil and grease that is detected by either test method. The permittee has agreed to use the standard EPA test method for this parameter.

Comment:

16. Include an effective date of September, 1975 for implementation of Condition 13 of the permit.

Resolution: Such is the intent of the permit condition that the prevention of solids and precipitates from entering the receiving waterway should be viewed as one aspect of the overall pollution abatement program. This condition would become fully effective when the secondary biological treatment system is completed and operational. However, if the permittee is presently preventing any solids and/or precipitates from entering the receiving waterway, it would be required to continue this program under the concept of non-degradation of the receiving waterway. In addition, the permittee will be required to report, as specified in the permit, on all effluent screenings, sludges and other solids associated with the wastewater discharge from the effective date of the permit. It is hoped that the above explanation will clarify the requirements of Condition 13 of this permit.

Comment:

17. Include an effective date of August, 1975 for implementation of Condition 15 of the permit.

Resolution: The intent of this condition of the permit is that it should become effective upon issuance of the permit. Any known contaminated runoff problem will be treated as part of the present discharge and will be subject to the limitations imposed in Conditions 9(c) and 10 of the permit. Furthermore, any contaminated runoff discharge should be monitored and sampled and this data should be forwarded to EPA as part of the required monthly report.

The DRBC's letter of July 10 to the Regional Administrator of EPA noted that according to the Commission Docket D-68-143 approved on June 26, 1974, color must be abated to a level of 100 Pt-Co units in accordance with the Commission's Resolution No. 74-1. This effluent limitation will be included in the final permit.

MCO 5357709

In addition, the DRBC requires the following effluent concentrations as set forth in its Commission's Resolution No. 72-1:

Chromium (hexavalent) - 0.05 mg/l
Oil and Grease - 10 mg/l

The above effluent concentration limitations are instantaneous maximum effluent limitations and have been included in the final permit. The maximum poundage limitation for Cr^{+6} has been deleted from the permit.

Several changes in the required monitoring have been made to more closely reflect the conditions of the permit. A minimum frequency of analysis has been included for both color and fecal coliform bacteria since both are limited in the permit. Also, a grab sample will be allowed for hexavalent chromium since the limitation on this parameter is an instantaneous maximum. A multiple grab sample has been specified for oil and grease for Sampling Schedule IV since the poundage limitation is a daily maximum and it is believed that such a sampling procedure will more accurately reflect the true daily poundage discharge.

MCO 5357710

CERTIFIED MAIL

Monsanto

MONSANTO INDUSTRIAL CHEMICALS CO.
Bridgeport, New Jersey 08014
Phone: (609) 487-3000

December 5, 1974

Ms. Helen Lee
Regional Hearing Clerk
United States Environmental Protection Agency
26 Federal Plaza
New York, New York 10007

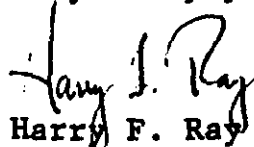
RE: Request for Adjudicatory Hearing - NPDES Permit No. NJ0005045

Dear Ms. Lee:

Per my phone conversation this morning with Mr. Coles Phinizy of your office I am forwarding Monsanto's Request for Adjudicatory Hearing to your attention. This Request is being mailed to you rather than delivered in person as Mr. Phinizy has advised that receipt within the next couple of days would be considered timely by EPA.

Should you need any additional information on this subject, please do not hesitate to contact me at the above address.

Very truly yours,


Harry F. Ray

Supt., Technical Services Dept.

/cmd

Attachments

MCO 5357711

bcc: G. F. Knollmeyer
H. F. Ray
P. B. Hodges G.O.
J. N. McGuire G.O.

Monsanto Company

CERTIFIED MAIL

Monsanto

MONSANTO INDUSTRIAL CHEMICALS CO.
Bridgeport, New Jersey 08014
Phone: (609) 467-3000

December 5, 1974

Ms. Helen Lee
Regional Hearing Clerk
United States Environmental Protection Agency
26 Federal Plaza
New York, New York 10007

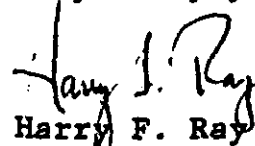
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Very truly yours,



Harry F. Ray
Supt., Technical Services Dept.

/cmd

Attachments

bcc: G. F. Knollmeyer
H. F. Ray
P. B. Hodges G.O.
J. N. McGuire G.O.

MCO 5357712

CERTIFIED MAIL

Monsanto

MONSANTO INDUSTRIAL CHEMICALS CO.
Bridgeport, New Jersey 08014
Phone: (609) 467-3000

SUBJECT: Request for Adjudicatory Hearing

TO: Regional Administrator
Environmental Protection Agency ("Agency")
Mr. Gerald M. Hansler
26 Federal Plaza
New York, New York 10007

FROM: Monsanto Company ("Applicant")
Delaware River Plant
P. O. Box 296
Bridgeport, New Jersey 08014

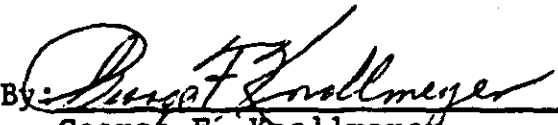
Requestor hereby requests an adjudicatory hearing in accordance with 40 CFR 125.32 et. seq. to reconsider the determination of the Administrator with regard to NPDES Permit No. NJ 0005045. In support of this case, Requestor further states as follows:

1. Requestor operates a chemical manufacturing facility at the address set forth above. Issuance of said NPDES permit in accordance with the determination made by the Administrator would result in an arbitrary and unreasonable hardship to Requestor.
2. Requestor agrees to make available for examination and cross-examination, at its expense, any employee of Requestor or a consultant employed by Requestor upon the request of the Presiding Officer, on his own motion, or on the motion of any party.
3. Attached hereto as Attachment A are:
 - a. Particular reasons for this request for an adjudicatory hearing.

MCO 5357713

- b. Particular issues which should be considered at the adjudicatory hearing.
- c. Proposed terms and conditions for said NPDES permit which, in the judgment of Requestor, are appropriate in order to carry out the intendment of the Federal Water Pollution Control Act.

Submitted by Requestor
MONSANTO COMPANY

By: 
George F. Knollmeyer
(Plant Manager)

Date: December 5, 1974

/cmd

MCO 5357714

ATTACHMENT A

MCO 5357715

| Item Number | Permit Reference | Issue Proposed | Requestor's Position |
|----------------|-------------------------------|---|--|
| 1. | Condition 10, Oil & Grease | Increase instantaneous maximum from 10 mg/l to 15 mg/l to correspond with the lbs./day discharge expected. | Although laboratory and pilot plant data have indicated that 10 mg/l will be achieved on the average, there is still a significant amount of uncertainty as to the range of control. This issue is further complicated by the well known problems with the method not actually measuring oil and grease in the true sense. |
| 2. | Condition 10, Chromium, Total | Delete daily maximum of 1.0 mg/l and insert daily average of 1.5 mg/l to correspond with the lbs./day discharge expected. | Laboratory studies have indicated that a reduction from the present discharge (5 mg/l avg.) to that proposed by us can be achieved. Further, for the Organic Chemical Industry, Chromium has not been identified as a significant pollutant nor have BPCTCA values been adopted as part of the Phase I Guidelines. |

ATTACHMENT A

MCO 5357716

| Item Number | Permit Reference | Issue Proposed | Requestor's Position |
|----------------|---|------------------------------------|---|
| 3. | Condition 10, Color | Delete effluent color requirement. | Color contribution to Delaware River is so small that it cannot be measured. Studies to date have shown that color removal is <u>not</u> economically feasible when considering the costs to achieve vs. the benefits realized. |
| 4. | Condition 12 a Sampling Schedules III, IV * | Eliminate this requirement. | This condition is not necessary to determine compliance with conditions 9 or 10 or any other condition of the NPDES Permit. If these data are desired, they should be requested outside the confines of this permit (with restraints on duration and appropriate compensation provided by EPA) so that failure to obtain data does not result in a permit violation. Further, the only nitrogenous compounds contained in the waste from this facility are present as a result of nutrient addition in the waste treatment plant. |



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

16 DEC 1974

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. George F. Knollmeyer, Plant Manager
Monsanto Industrial Chemicals Co.
Bridgeport, New Jersey 08014

Re: Bridgeport, NJ facility
Permit No.: NJ 0005045

Dear Mr. Knollmeyer:

The United States Environmental Protection Agency has received your letter dated December 5, 1974 containing a timely request for an adjudicatory hearing pursuant to the provisions of Title 40, Section 125 of the Code of Federal Regulations, as amended, 39 Federal Register 143, pp. 27079-27084 (July 24, 1974). This request concerned the National Pollutant Discharge Elimination System (NPDES) permit issued by the EPA to the above-referenced facility. Please be advised that the request has been granted.

Enclosed please find a copy of the Public Notice of the granting of this hearing. This Notice will be published on the date indicated thereon. This Notice details the issues you have proposed for consideration at the hearing as well as the conditions of the issued NPDES permit which I have determined are contested. The effectiveness of these contested conditions is stayed pending final EPA action pursuant to 40 CFR 125.36.

As a result of this Public Notice procedure all parties to the hearing will be determined. Subsequently a time and place for the hearing will be set in consultation with all parties and the Presiding Officer.

Please be advised that the conditions of the issued permit not

MCO 5357717

referenced in the Public Notice as stayed are determined to be uncontested, issued and effective. Failure to comply with the uncontested conditions of the permit will result in a violation of the permit.

This matter has been assigned Docket No. II-WP-74-142. Please refer to this number in any future correspondence. In addition, please direct any future correspondence concerning this matter, in triplicate, to:

Ms. Helen Lee
Regional Hearing Clerk
Room 1009
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10007

Thank you very much for your cooperation with the NPDES program.

Sincerely yours,



Meyer Scolnick
Director
Enforcement and Regional Counsel Division

Enclosure

cc: Mr. Howard L. Minckler
Vice-President & General Manager
Monsanto Company
800 North Lindbergh Blvd.
St. Louis, Missouri 63166

David J. Bardin, Commissioner
New Jersey Department of
Environmental Protection
Labor and Industry Building
P. O. Box 1390
Trenton, New Jersey 08625

Mr. James F. Wright, Executive Director
Delaware River Basin Commission
25 Scotch Road
P. O. Box 360
Trenton, New Jersey 08603

Helen Lee
Regional Hearing Clerk

MCO 5357718

United States Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10007
212-264-2515

PUBLIC NOTICE OF ADJUDICATORY HEARING

No. NPDES

74-1772

Date: DEC 27 1974

Notice is hereby given that the United States Environmental Protection Agency (EPA) has granted a request from

The Monsanto Company
800 North Lindbergh Blvd.
St. Louis, Missouri 63166

for an Adjudicatory Hearing on the National Pollutant Discharge Elimination System (NPDES) permit (No. NJ 0005045) issued under the Federal Water Pollution Control Act Amendments of 1972, 33 U.S. Code §§1251-1376 (the Act) for the Monsanto Company Industrial Chemicals facility in Bridgeport, New Jersey.

Public Notice of EPA's intention to issue the subject NPDES permit was given on May 31, 1974 , Notice No. NPDES 74-952

MCO 5357719

The following is a brief description of the permittee's activities.

Monsanto operates, at Bridgeport, a facility that manufactures various organic chemicals, including phthalic anhydride, phthalate ester, tetrachloro phthalic anhydride, phosphate esters, phenyl ethylphenyl methane and benzyl chloride.

The permittee presently discharges its entire flow of an average of 1.45 million gallons per day (MGD) to the Delaware River through a 12 inch pipe. This discharge, which consists of process water, cooling water and boiler blowdown water, will be redirected through the applicant's proposed secondary treatment system, scheduled to be constructed by July 31, 1975.

The existing discharge is located on the New Jersey side of the Delaware River, approximately 600 feet up-river from the boundary with the State of Delaware.

MCO 5357720

The following issues have been raised by the requestor of the Adjudicatory Hearing.

1) The instantaneous maximum effluent limitation in Condition 10 of the permit for the parameter Oil and Grease should be increased from 10 mg/l to 15 mg/l.

2) The daily maximum effluent limitation in Condition 10 of the permit for the parameter Chromium-total should be increased from 13 pounds a day-gross to a level which reflects an average discharge concentration of 1.5 mg/l.

3) The instantaneous maximum effluent limitation in Condition 10 of the permit for the parameter Color of 100 Pt-Co units should be eliminated.

4) The additional monitoring requirements in Condition 12(a) of the permit for the parameters $\text{NH}_3\text{-N}$, Kheldahl-N, $\text{NO}_3\text{-N}$, BOD_5 and BOD_{20} should be eliminated.

MCO 5357721

Pending the completion of the Adjudicatory Hearing process the effectiveness of the following conditions to the issued NPDES permit is stayed.

1) Condition 10 as it sets an instantaneous maximum effluent limitation for the parameter Oil and Grease, as it sets a daily maximum effluent limitation for the parameter Chromium-total, and as it sets an instantaneous maximum effluent limitation for the parameter Color.

2) Condition 12(a) as it sets additional monitoring requirements for the parameters $\text{NH}_3\text{-N}$, Kheidahl-N, $\text{NO}_3\text{-N}$, BOD_5 and BOD_{20} .

MCO 5357722

The Adjudicatory Hearing shall be conducted pursuant to the procedures set forth under 40 Code of Federal Regulations, Section 125.36, as amended, by 39 Federal Register 143, pp.27079-27084 (July 24, 1974). The following rules with regard to the entire Adjudicatory Hearing process shall be followed:

A. Any interested person may file with the Regional Hearing Clerk a request to be admitted as a party to the hearing. Such a request must be filed by **JAN 27 1975**

B. Any party may at any time prior to the hearing submit any documents or written evidence or testimony which he intends to introduce at the hearing;

C. No sooner than thirty (30) days following the date of this notice, the Presiding Officer may set a time and location of a pre-hearing conference and will so notify all parties;

D. The permit may be amended by the Regional Administrator prior to or after the Adjudicatory Hearing and any person interested in the particular proposed permit must request to be a party in order to preserve any right to appeal the final administrative determination;

E. Parties may be represented by counsel or other duly authorized representatives.

F. Any State with certification rights under Section 1341 of the Act must certify or deny certification within thirty (30) days after it is notified that a permit has been amended after a request for an Adjudicatory Hearing has been granted. Failure to certify or deny certification shall be deemed a waiver of such certification rights.

A request to be admitted as an additional party for this hearing shall set forth all material issues of fact the requestor seeks to be considered at the Adjudicatory Hearing (whether such issues are noticed herein or are in addition thereto) and shall:

- (i) State the name and address of the person making such request;
- (ii) Identify the interest of the requestor which is affected by the proposed issuance of the permit contained in the determination of the Regional Administrator;
- (iii) Identify any persons whom the requestor represents;
- (iv) Include an agreement by the requestor to be subject to examination and cross-examination and to make any employee or consultant of such requestor or other person represented by the requestor available for examination and cross-examination at the expense of such requestor or such other person upon the request of the Presiding Officer, on his own motion, or on the motion of any party;
- (v) State with particularity the reasons for the request;
- (vi) State with particularity the issues proposed to be considered at the hearing; and
- (vii) Include proposed terms and conditions which, in the judgment of the requestor, would be required to carry out the intentment of the Act.

An original and two (2) copies of all documents or papers required or authorized to be filed shall be filed with the Regional Hearing Clerk.

Except for requests to be a party, at the same time that a party files with the Regional Hearing Clerk any additional issues for consideration at the hearing or any written testimony, documents, papers, exhibits, or materials proposed to be introduced into evidence, it shall serve upon all other parties copies thereof. A certification of service shall be provided on or accompany each document or paper filed with the Regional Hearing Clerk.

The address and phone number of the Regional Hearing Clerk follows:

Ms. Helen Lee
U. S. Environmental Protection Agency
Region II
Room 1009
26 Federal Plaza
New York, New York 10007
(212) 264-9887

CONFIDENTIAL
ATTORNEY-CLIENT PRIVILEGE
ATTORNEY WORK PRODUCT

The following address and phone number is supplied for any interested person to use for contact with the EPA for matters concerning the procedures to be followed in the conduct of the Adjudicatory Hearing:

Coles H. Phinizy, Jr., Attorney
U. S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10007
(212) 264-4927/8

Copies of the permit and a fact sheet (if any) may be obtained from the Status of Compliance Branch, EPA, Region II, at the above address, either by mail, by calling 212-264-9881 or by coming in person between 8:00 a.m. and 4:30 p.m. Monday through Friday. Other forms and documents relating to the permit may be inspected at the office of the Status of Compliance Branch. Copies will be provided at a charge of \$.20 per copy sheet.

Chief
Status of Compliance Branch
Enforcement and Regional Counsel Division

JUN 16 1975



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

JUN 12 1975

Phocion S. Park
Senior Attorney
Monsanto Company
800 N. Lindbergh Blvd.
St. Louis, Missouri 63166

CONFIDENTIAL
ATTORNEY - CLIENT PRIVILEGE
ATTORNEY WORK PRODUCT

Re: Monsanto Company
Bridgeport, New Jersey facility
NPDES Permit No: NJ 000 5045
Adjudicatory Hearing
Docket No: II-WP-74-142

Dear Mr. Park:

Pursuant to our telephone conversations and our meeting of April 28, 1975, regarding the settlement of the above-mentioned administrative action, enclosed please find: (1) a stipulation which I believe reflects the agreements reached in our conversations regarding the issues subject to the administrative action, and (2) copies of pages 5 and 8 of 17 of the subject NPDES permit revised to reflect this stipulation. The amended conditions on these revised pages will become effective and enforceable as of the date of the execution of the stipulation by the Director of the Enforcement and Regional Counsel Division.

If the enclosed stipulation is satisfactory, please arrange for its execution by a corporate officer of Monsanto Company of the rank of vice president or above and return it and the revised pages to me at the above address as soon as possible. I will notify you by telephone immediately after the document is executed by the Director of the Enforcement and Regional Counsel Division and will send you a copy for your records of the stipulation and revised pages.

MCD 5357726

Thank you for your cooperation in this matter. Please do not hesitate to contact me if you have any questions.

Sincerely yours,



Coles H. Phinizy, Jr.

Attorney

Water Enforcement Branch
Enforcement and Regional Counsel Division

Enclosure

cc: Ms. Helen Lee
Regional Hearing Clerk

Mr. Jeffrey Zelikson, P.E.
Deputy Assistant Director
Monitoring, Surveillance and
Enforcement Element
Division of Water Resources
State of New Jersey
Department of Environmental
Protection
1474 Prospect Street
Trenton, New Jersey 08625

Mr. George Knollmeyer
Plant Manager
Monsanto Industrial Chemicals Co.
Bridgeport, New Jersey 08014

MCO 5357727

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION II
New York, New York 10007

-----X
In the Matter of

National Pollutant Discharge
Elimination System

Permit for Monsanto Company
St. Louis, Missouri

Permittee
-----X

Bridgeport, New Jersey
facility

NPDES Permit No. NJ 000 5045
Adjudicatory Hearing
Docket No.: II-WP-74-142

STIPULATION

The permittee herein above named and the United States Environmental Protection Agency - Region II (EPA) stipulate and agree as follows in regard to the above-named administrative action:

I. The permittee withdraws its request for an adjudicatory hearing;

II. The permit involved in this proceeding is modified, and said modification becomes effective as of the date of the execution of this stipulation by the Director of the Enforcement and Regional Counsel Division of EPA, in the following respects:

A. Condition 10 Modifications:

1) An average limitation for the parameter Oil and Grease indicated in Condition 10 of the subject permit is set at 10 mg/l. No such Average limitation had been inserted in the permit.

2) The Maximum limitation for the parameter Oil and Grease indicated in Condition 10 of the subject permit is modified from a limitation of 10 mg/l to a limitation of 15 mg/l. The footnote reference to the phrase, "These values are instantaneous maximum effluent limitations", on the Maximum limitation is removed.

3) The Maximum limitation for the parameter Color (Pt-Co units) indicated in Condition 10 of the subject permit is modified from a limitation of 100 Pt-Co units to a limitation of 600 Pt-Co units. The footnote reference to the phrase, "As listed in Delaware River Basin Commission Docket S-68-143 and Resolution Number 74-1. This value is also an instantaneous maximum effluent limitation", on the maximum limitation is removed.

B. Condition 12 Modifications:

1) The footnote reference in Sampling Schedules III and IV of Condition 12(a) of the subject permit to additional sampling for NH₃-N, Kjeldahl-N, NO₃-N and BOD₂₀ is removed.

2) The footnote reference in Sampling Schedules III and IV of Condition 12(a) of the subject permit to a requirement of multiple grab samples for the parameter Oil and Grease is removed.

3) The requirement for the monthly monitoring of the parameter Kjeldahl-Nitrogen in Sampling Schedule IV of Condition 12(a) of the subject permit is modified to require weekly monitoring.

4) The requirement for the monitoring of the parameter Kjeldahl-Nitrogen in Sampling Schedules III and IV of Condition 12(a) of the permit is modified to require the monitoring of the parameter Total Kjeldahl-Nitrogen.

IV. There are no parties to these proceedings other than the parties making this stipulation.

Monsanto Company

By: _____

Title: _____

Date: _____

U.S. Environmental Protection
Agency - Region II

By: Meyer Scolnick, Director
Enforcement and Regional
Counsel Division

10. Required Effluent Discharge. During the period beginning December 1, 1975 and lasting until the date of expiration of this permit, discharges shall comply with Condition 9(c) above and shall not exceed the values listed below for those parameters indicated:

| <u>Discharge Serial Number</u> | <u>Parameter</u> | <u>Discharge Limitation in kg/day (lbs/day) - Gross</u> | | <u>Other Limitations</u> | |
|---|---------------------------|---|--------------------------|--------------------------|----------------|
| | | <u>Daily Average</u> | <u>Daily Maximum</u> | <u>Average</u> | <u>Maximum</u> |
| Total for all discharges to the receiving waterway | pH (pH units) | | | 6.0(minimum) | 9.0 |
| | Temperature °C(°F) | | | | 43.4(110)* |
| | BOD ₅ | 1090(2400) | 1820(4010) | | |
| | Total Suspended Solids | 570(1250) | 936(2065) | | |
| | Total Organic Carbon | 2180(4800) | 3490(7680) | | |
| | Oil & Grease | | 88(194) | 10mg/l | 15mg/l |
| | Chromium-total | | 6(13) | | |
| | Chromium-Hexavalent | | | | 0.1 mg/l* |
| | Phenols | 50(110) | 100(220) | | |
| | Color (Pt-Co units) | | | | 600 |

*These values are instantaneous maximum effluent limitations.

MCO 5357730

Sampling Schedules III and IV - Sampling Schedule III shall commence upon start-up of the treatment facilities required to comply with Condition 10. Schedule IV shall commence upon notification by the Regional Administrator. Commencement of Schedule IV will coincide with the effluent values reaching satisfactory steady state conditions.

| <u>Discharge Serial No.</u> | <u>Parameter</u> | <u>Minimum Freq. of Analysis</u> | | <u>Sample Type</u> |
|---------------------------------|-------------------------|--------------------------------------|-----------------|--------------------|
| | | <u>Sched.III</u> | <u>Sched.IV</u> | |
| 001 | pH | continuous | continuous | |
| | Temperature | continuous | continuous | |
| | BOD5 | daily | twice/weekly | composite |
| | Total Suspended Solids | daily | twice/weekly | composite |
| | Total Organic Carbon | daily | twice/weekly | composite |
| | Oil & Grease | daily | weekly | grab |
| | Chromium-total | weekly | twice/monthly | composite |
| | Chromium-Hexavalent | weekly | monthly | grab |
| | Phenols | daily | twice/weekly | composite |
| | Total Kjeldahl-Nitrogen | weekly | weekly | composite |
| | Color | weekly | monthly | grab |
| | Fecal Coliform | weekly | monthly | grab |

(b) Modifications to Sampling Schedules - The permittee may submit for approval an alternate schedule(s) to account for any realignment of discharges, for substitutions of parameters to be sampled, for analytical and sampling methods to be utilized, for elimination of intake sampling, for realignment of sampling locations so that concentrations to be measured are within reliable sensitivity ranges of the analytical techniques, and for the compositing by volume of individual discharge samples to make a single plant sample. With regard to substituting parameters such as TOC or COD for BOD, the permittee shall provide test data to support the correlation between the parameters. As for elimination of intake monitoring, the permittee shall provide sufficient data to establish the average levels of intake parameters and demonstrate that any variations in the intake characteristics would have minimum impact upon the permittee's discharge(s). In such cases, the alternate monitoring schedule shall provide for periodic verification of parameter correlations and intake parameter levels.

If the permittee monitors any pollutant more frequently than is required by this permit, he shall include the results of such monitoring in the calculation and reporting of the values required in the Discharge Monitoring Report Form (EPA Form 3320-1 (10-72)) in Condition 12(f). Such increased frequency shall be indicated on the Discharge Monitoring Report form.

Permit No.: NJ0005045

Name of Permittee: Monsanto Company

Effective Date: January 31, 1975

Expiration Date: January 31, 1980

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

DISCHARGE PERMIT

In reference to the above application for a permit authorizing the discharge of pollutants in compliance with the provisions of the Federal Water Pollution Control Act, as amended by the Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500, October 18, 1972 (33 U.S.C. §1251-1376) (hereinafter referred to as "the Act"), Monsanto Company

800 North Lindbergh Boulevard
St. Louis, Missouri 63166

(hereinafter referred to as "the permittee")

is authorized by the Regional Administrator, Region II, U. S. Environmental Protection Agency
to discharge from its plant located at

Bridgeport, New Jersey

to the Delaware River

in accordance with the following conditions.

MCO 5357741

1. All discharges authorized herein shall be consistent with the terms and conditions of this permit; facility expansions, production increases or process modifications which result in new or increased discharges of pollutants must be reported by submission of a new NPDES application, or if such new or increased discharge does not violate the effluent limitations specified in this permit, by submission to the Regional Administrator of notice of such new or increased discharges of pollutants; the discharge of any pollutant more frequently than or at a level in excess of that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit.

2. After notice and opportunity for a public hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

- a. Violation of any terms or conditions of this permit;
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

3. Notwithstanding Condition 2 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit, the Regional Administrator shall revise or modify this permit in accordance with the toxic effluent standard or prohibition and so notify the permittee.

4. The permittee shall allow the Regional Administrator or his authorized representative and/or the authorized representative of the State water pollution control agency, in the case of non-Federal facilities, upon the presentation of his credentials:

- a. To enter upon the permittee's premises in which an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit;
- b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit;
- c. To inspect at reasonable times any monitoring equipment or monitoring method required by this permit;
- d. To sample at reasonable times any discharge of pollutants.

5. The permittee shall at all times maintain in good working order and operate as efficiently as possible any facilities or systems of treatment or control installed or utilized by the permittee to achieve compliance with the terms and conditions of this permit.

6. The issuance of this permit does not convey any property rights either in real estate or material, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of rights, nor any infringement of Federal, State or local laws or regulations; nor does it obviate the necessity of obtaining State or local assent required by law for the discharge authorized.

7. This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

8. The specific effluent limitations and other pollution controls applicable to the discharge permitted herein are set forth in the following conditions. The following conditions also set forth self-monitoring and reporting requirements. Unless otherwise specified, the permittee shall submit duplicate original copies of all reports to the head of the State water pollution control agency and the Regional Administrator. Except for data determined to be confidential under Section 308 of the Act, all such reports shall be available for public inspection at the office of the Regional Administrator. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

MCO 5357743

9. General Limitations.

a. The permittee shall not discharge hazardous substances into or upon navigable waters or adjoining shorelines in quantities defined as harmful in regulations promulgated by the Administrator pursuant to Section 311(b)(4) of the Federal Water Pollution Control Act, as amended. Nothing in this permit shall be deemed to preclude the institution of any legal action nor relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Federal Water Pollution Control Act, as amended, or under any other Federal or State law or regulations.

b. Except as specifically authorized in this permit, the permittee shall not discharge floating solids or visible foam in other than trace amounts.

c. Initial Effluent Limitations. During the period beginning on the effective date of this permit and lasting until November 30, 1975 discharges shall be limited by the permittee as specified below:

| <u>Discharge Serial Number</u> | <u>Parameter</u> | <u>Discharge Limitation in kg/day (lbs/day) - Gross</u> | | <u>Other Limitations</u> | |
|--|-----------------------------|---|--------------------------|--------------------------|----------------|
| | | <u>Daily Average</u> | <u>Daily Maximum</u> | <u>Average</u> | <u>Maximum</u> |
| Total for all discharges to the receiving waterway. | pH(pH Units) | | | 1.0-12.0 (range) | |
| | Temperature °C(°F) | | | 43.4 (110) | |
| | BOD ₅ | 10900(24000) | 16800(37000) | | |
| | Total Suspended Solids | 8175(18000) | 24065(53000) | | |
| | Total Organic Carbon | 7500(16500) | 12720(28000) | | |
| | Oil & Grease | 2140(4700) | 5110(11250) | | |
| | Kjeldahl Nitrogen | 171(375) | 454(1000) | | |
| | Chromium-Total | 28(60) | 46(100) | | |
| | Chromium - Hexavalent | 12(25) | 22(40) | | |
| | Phenols | 1000(2200) | 1865(4100) | | |
| | Fecal Coliform Bacteria* | | | | |
| | (MPN/100 ml) | | | 200 | 400 |
| | Color (Pt-Co units) | | | 800 | 2000 |

* Only if domestic wastewater is present in the discharge.

MCO 5357744

10. Required Effluent Discharge. During the period beginning December 1, 1975 and lasting until the date of expiration of this permit, discharges shall comply with Condition 9(c) above and shall not exceed the values listed below for those parameters indicated:

| Discharge Serial Number | Parameter | Discharge Limitation in kg/day (lbs/day) - Gross | | Other Limitations | |
|--|---------------------------|---|------------------|-------------------|--------------|
| | | Daily Average | Daily Maximum | Average | Maximum |
| Total for all discharges to the receiving waterway. | pH (pH units) | | | 6.0(minimum) | 9.0 |
| | Temperature °C(°F) | | | | 43.4(110)° |
| | BOD ₅ | 1090(2400) | 1820(4010) | | |
| | Total Suspended Solids | 570(1250) | 936(2065) | | |
| | Total Organic Carbon | 2180(4800) | 3490(7680) | | |
| | Oil & Grease | | 88(194) | 10mg/l | 15 mg/l |
| | Chromium-total | | 6(13) | | |
| | Chromium-Hexavalent | | | | 0.1 mg/l |
| | Phenols | 50(110) | 100(220) | | |
| | Color (Pt-Co units) | | | | 100** 600 |

*These values are instantaneous maximum effluent limitations.

**As listed in Delaware River Basin Commission Docket S-68-143 and Resolution Number 14-1. This value is also an instantaneous maximum effluent limitation.

11. Schedule of Compliance.* The permittee shall comply with the following schedule and shall report to both the Regional Administrator and the State Agency within 14 days following each date on the schedule detailing its compliance or noncompliance** with the schedule date and requirement:

(a) The permittee shall complete construction of the secondary treatment facilities by July 31, 1975.

(b) The permittee shall attain the operational levels consistent with the design criteria of the secondary treatment facilities by November 30, 1975. If the effluent limitations for total chromium and/or color and/or phenols and/or total organic carbon are not being attained at this time, the Regional Administrator shall specify an additional schedule of compliance for these parameters that will terminate not later than June 30, 1977.

*If the time period allotted for the completion of an interim requirement specified above is greater than 9 months, then the permittee shall submit a report detailing its progress toward completion of the interim requirement at the end of the first 9-month period and at the end of each succeeding 9-month period (including, of course, the report, specified above, required within 14 days following the specified completion date).

**Each notice of noncompliance shall include the following information:

- (1) A short description of the noncompliance;
- (2) A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirement without further delay;
- (3) A description of any factors which tend to explain or mitigate the noncompliance; and
- (4) An estimate of the date permittee will comply with the elapsed schedule requirement and an assessment of the probability that permittee will meet the next schedule requirement on time.

***State Requirements

All reports, plans and/or specifications that propose new or modified waste treatment and/or disposal facilities must be approvable and signed, and sealed, by a professional engineer, licensed to practice in the State in which the facilities are to be built.

12. Monitoring and Recording. The permittee shall monitor and record the quantitative values of each discharge according to the following schedules and other provisions: For each discharge and for each Sampling Schedule listed below, the flow (in gallons per day) shall be measured.* Where net values are listed in Conditions 9(c) and/or 10 the surface water intake is to be sampled with the same frequency and type of sample as specified below for each required parameter.

(a) Sampling Schedule I - The permittee shall submit a comprehensive monitoring report by March 31, 1975. The permittee shall take daily 24-hour composite samples** of intake water (surface water body only) and of each discharge over a typical production period of at least 7 consecutive operating days. One or two grab samples per day shall also be taken during maximum anticipated waste loadings (i.e. maximum production periods, batch dumping, washing operations). This sampling program shall be carried out to insure complete, reliable results which will typify the plant's daily discharge.

In lieu of this sampling program the permittee may submit documentation indicating the results of previous sampling programs for all or part of the required parameters. The data utilized in obtaining the average and maximum values which appear in the permit application can be substituted for this report if the reported values can be shown to be representative of the permittee's current discharge(s). The following parameters are to be reported on: pH, Temp., BOD₅, Tot. Suspended Solids, Organic Carbon, Oil & Grease, Kjeldahl-Nitrogen, Chromium-Tot., Chromium-Hexavalent Phenols, Fecal Coliform and Color.

Sampling Schedule II - This schedule shall commence upon completion of Schedule I and continue until start-up of the treatment facilities required to comply with the effluent limitations of Condition 10.

The permittee shall take 24-hour composite samples** on a monthly basis for the following parameters: Ph, Temperature, BOD₅, Total Suspended Solids, Total Organic Carbon, Oil & Grease, Chromium-Total, Phenols.

*For all continuous discharges, flow shall be measured and recorded continuously; for intermittent discharges, the flow shall be measured and reported at a frequency coinciding with the most frequently sampled parameter. Methods, equipment, installation and procedures shall conform to those prescribed in the Water Measurement Manual, U. S. Department of the Interior, Bureau of Reclamation, Washington, D.C., 1967.

**Grab samples only shall be taken for analysis of dissolved oxygen, temperature, oil and grease, pH and any bacteriological analysis. Care shall be exercised when collecting a composite sample such that the proper preservative is present in the sample container during sample collection. Depending on the analysis to be conducted, several different containers and preservation techniques may be required. Samples shall be analyzed as quickly as possible after collection and in no case shall the maximum holding time exceed that contained in the references cited in Condition 12(e).

Sampling Schedules III and IV - Sampling Schedule III shall commence upon start-up of the treatment facilities required to comply with Condition 10. Schedule IV shall commence upon notification by the Regional Administrator. Commencement of Schedule IV will coincide with the effluent values reaching satisfactory steady state conditions.

| Discharge Serial No. | Parameter | Minimum Freq. of Analysis | | Sample Type |
|-------------------------|------------------------|------------------------------|--|-------------|
| | | Sched. III | Sched. IV | |
| 001 | pH | continuous | continuous | |
| | Temperature | continuous | continuous | |
| | BOD ₅ | daily | twice/weekly | composite |
| | Total Suspended Solids | daily | twice/weekly | composite |
| | Total Organic Carbon | daily | twice/weekly | composite |
| | Oil & Grease | daily | weekly | grab** |
| | Chromium-total | weekly | twice/monthly | composite |
| | Chromium-Hexavalent | weekly | monthly | grab |
| | Phenols | daily | twice/weekly | composite |
| | Kjeldahl-Nitrogen | weekly | monthly ^{twice/weekly} | composite |
| | Color | weekly | monthly | grab |
| | Fecal Coliform | weekly | monthly | grab |

*See additional monitoring requirements at bottom of this page.

(b) Modifications to Sampling Schedules - The permittee may submit for approval an alternate schedule(s) to account for any realignment of discharges, for substitutions of parameters to be sampled, for analytical and sampling methods to be utilized, for elimination of intake sampling, for realignment of sampling locations so that concentrations to be measured are within reliable sensitivity ranges of the analytical techniques, and for the compositing by volume of individual discharge samples to make a single plant sample. With regard to substituting parameters such as TOC or COD for BOD, the permittee shall provide test data to support the correlation between the parameters. As for elimination of intake monitoring, the permittee shall provide sufficient data to establish the average levels of intake parameters and demonstrate that any variations in the intake characteristics would have minimum impact upon the permittee's discharge(s). In such cases, the alternate monitoring schedule shall provide for periodic verification of parameter correlations and intake parameter levels.

If the permittee monitors any pollutant more frequently than is required by this permit, he shall include the results of such monitoring in the calculation and reporting of the values required in the Discharge Monitoring Report Form (EPA Form 3320-1 (10-72)) in Condition 12(f). Such increased frequency shall be indicated on the Discharge Monitoring Report form.

*Weekly 24-hour composite sampling for NH₃-N, Kjeldahl-N and NO₃-N; monthly 24-hour sampling for BOD with recording of BOD readings at 3, 5, 7, 10, 13 and 17 days; record average daily plant flow rate on actual date of N-series or BOD₂₀ sampling.

**Multiple grab samples will be required for this parameter in Sampling Schedule IV.

MCO 5357748

(c) Quality Control - Adequate care shall be maintained in obtaining, recording, and reporting the required data on effluent quality and quantity, so that the precision and accuracy of the data will be equal to or better than that achieved by the prescribed standard analytical procedures.

The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at sufficiently frequent intervals to ensure accuracy of measurements.

Sampling shall be representative of the volume and quality of effluent discharged over the sampling and reporting period.

The permittee is responsible for assuring that the methodology used is reliable for their specific wastes in their laboratory. The permittee must be able to demonstrate to the Regional Administrator that they have a viable quality control program.

(d) Recording - The permittee shall maintain and record the results of all required analyses and measurements and shall record, for all samples, the date and time of sampling, the sample method used, the dates analyses were performed, who performed the sampling and analyses, and the results of such analyses.

All records shall be retained for a minimum of 3 years, such a period to be extended during the course of any unresolved litigation or when so requested by the Regional Administrator. The permittee also shall retain all original stripchart recordings from any continuous monitoring instrumentation and any calibration and maintenance records for a minimum of 3 years, such period to be extended during the course of any unresolved litigation or when so requested by the Regional Administrator.

The permittee shall provide the above records and shall demonstrate the adequacy of the flow measuring and sampling methods upon request of the Regional Administrator. The permittee shall identify the effluent sampling point used for each discharge pipe by providing a sketch or flow diagram, as appropriate, showing the locations.

(e) Sampling and Analysis

All sampling and analytical methods used to meet the monitoring requirements specified above shall conform to guidelines establishing test procedures for the analysis of pollutants, published pursuant to Section 304(g) of the Federal Water Pollution Control Act, as amended. If the Section 304(g) guidelines do not specify test procedures for any pollutants required to be monitored by this permit and until such guidelines are promulgated, sampling and analytical methods used to meet the monitoring requirements specified in this permit shall, unless otherwise specified by the

Regional Administrator, conform to the latest edition of the following references:

Standard Methods for the Examination of Water and Wastewaters, 13th Edition, 1971 American Public Health Association, New York, New York 10019.

A.S.T.M. Standards, Part 23, Water; Atmospheric Analysis, 1972, American Society for Testing and Materials, Philadelphia, Pennsylvania 19103.

W.Q.O. Methods for Chemical Analysis of Water and Wastes, April 1971, Environmental Protection Agency, Water Quality Office, Analytical Quality Control Laboratory, NERC, 1014 Broadway, Cincinnati, Ohio 45268.

(f) Reporting

The results of the above monitoring requirements shall be reported by the permittee in the units specified in Conditions 9(c) and 10. A report or a written statement shall be submitted even if no discharge occurred during the reporting period. A report shall also be submitted if there have been any modifications in the waste collection, treatment, and disposal facilities, changes in operations procedures, or other significant activities which alter the quality and quantity of the discharges or otherwise concern these Conditions. Permanent elimination of a discharge shall be promptly reported by the permittee in writing to the Regional Administrator.

The permittee shall include in this report any previously approved non-standard analytical methods used. Copies of the report shall be sent to both the Regional Administrator and the State Agency on the 10th of each month reporting the monitoring data from the previous month. A Discharge Monitoring Report form [EPA Form 3320-1 (10-72)] shall be used for reporting.

(g) Other Requirements

The permittee shall comply with all monitoring, recording, and reporting requirements of the State in which the discharge occurs.

The permittee shall transmit to the Regional Administrator a duplicate copy of any reports on radioactive liquid releases required to be submitted to the Atomic Energy Commission.

The permittee shall transmit to the Regional Administrator a duplicate copy of any reports on pesticides required to be submitted to the U. S. Department of Agriculture.

13. Sludge Disposal. Collected screenings, sludges, and other solids and precipitates separated from the permittee's discharges authorized by this permit and/or intake or supply water by the permittee shall be disposed of in such a manner as to prevent entry of such materials into navigable waters or their tributaries. Any live fish, shellfish, or other animals collected or trapped as a result of intake water screening or treatment may be returned to their water body habitat. The permittee shall report on all effluent screenings, sludges and other solids associated with the discharge herein described. The following data shall be reported together with the monitoring data required in Condition 12:

- a. The sources of the materials to be disposed of;
- b. The approximate volumes and weights;
- c. The method by which they were removed and transported;
- d. Their final disposal locations.

14. Air Emissions. Any air emissions containing waste gases and/or particulate matter from existing or future waste treatment facilities associated with the discharge herein described shall not exceed the permissible levels specified in Federal and State Air Quality Standards.

15. Storm Water. Any accumulated storm waters from the plant grounds which have come into contact with raw materials, chemicals, oils, contaminants, impurities, or other materials normally not present in storm water runoff shall not be discharged into navigable waters or their tributaries without prior treatment and required authorization.

16. Discharge Containing Parameter Not Previously Reported. The permittee shall not discharge any wastewater containing a substance or characterized by a parameter which was indicated as absent in its NPDES Permit Application. In the event of such a discharge, the permittee shall notify the Regional Administrator and the State Agency prior to the discharge.

17. Non-Compliance with Conditions. In the event the permittee is unable to comply with any of these conditions, due, among other reasons, to:

- (1) Breakdown of waste treatment equipment, (biological and physical-chemical systems including, but not limited to, all pipes, transfer pumps, compressors, collection ponds or tanks for the segregation of treated or untreated wastes, ion exchange columns, or carbon absorption units);
- (2) Accidents caused by human error or negligence; or
- (3) Other causes, such as acts of nature,

the permittee shall notify the Regional Administrator and the State Agency immediately by telephone and in writing within five days. The written notification shall include the following pertinent information:

- (1) Cause of noncompliance;
- (2) A description of the noncomplying discharge including its impact upon the receiving waters;
- (3) Anticipated time the condition of noncompliance is expected to continue, or if such condition has been corrected, the duration of the period of noncompliance;
- (4) Steps taken by the permittee to reduce and eliminate the noncomplying discharge; and
- (5) Steps to be taken by the permittee to prevent recurrence of the condition of noncompliance.

Permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from noncompliance with any effluent limitation specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

Nothing in this permit shall be construed to relieve the permittee from appropriate civil or criminal penalties for non-compliance.

MCO 5357752

18. Alternate Power Supply. The permittee shall provide by July 31, 1975 an alternate source of power to operate all waste treatment facilities or indicate, in writing to the Regional Administrator, that production shall be controlled or the discharge shall be handled in such a manner that, in the event the primary source of power to the waste treatment facilities fails, any discharge into the receiving waters will comply with the limits set herein. This alternate power supply, whether from a generating unit located at the plant site or purchased from an independent producer of power, must be separate from the existing power source used to operate the waste treatment facilities and must be operational at the time construction of the treatment facilities has been completed. If a separate facility located at the plant site is to be used, the permittee shall certify in writing to the Regional Administrator and to the State Agency when the facility is completed and prepared to generate power.

19. Bypass Provision. There shall be no bypass of the waste treatment facilities which would allow the entry of untreated or partially treated wastes to the receiving waters.

20. Authorized Signature for Reporting Requirements. All reports required to be submitted by a corporation must be signed by a principal executive officer of at least the level of vice president, or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the application form originates. In the case of a partnership or a sole proprietorship, all reports must be signed by a general partner or the proprietor respectively. In the case of a municipal, State, Federal or other public facility, the application must be signed by either a principal executive officer, ranking elected official or other duly authorized employee.

21. Any person, firm or other entity discharging suspended solids into a navigable waterway or tributary thereof, shall reimburse the Federal Government for the additional Federal maintenance dredging cost which results from the discharge of solids. In order to determine the amount of solids discharged and the assessed charges, the permittee shall submit to the Philadelphia District of the U.S. Army Corps of Engineers the following information and data every six months from the date of issuance of this permit to its expiration unless notified otherwise:

1. the source of the facility's intake water (well, municipal, river, etc);

MCO 5357753

2. the daily average volume of intake water from each intake source (M.G.D. or fraction thereof);

3. the average pounds per day of suspended solids discharged from each discharge point (gross weight); or,

4. in lieu of 1, 2, and 3, a certification signed by the principal executive officer, or his authorized representative, that the total amount of suspended solids discharged from the facility is less than 1,000 pounds per day.

MCO 5357754

Definitions

Regional Administrator: Regional Administrator
Region II
Environmental Protection Agency
26 Federal Plaza
New York, New York 10007
ATTN: Status of Compliance Branch

State Certifying Agency: Director
Division of Water Resources
New Jersey Department of
Environmental Protection
Labor & Industry Building
P.O. Box 1390
Trenton, New Jersey 08625

Daily - each operating day.

Weekly - every seventh day (the same day each week) and a normal operating day

Monthly - one day each month (the same day each month) and a normal operating day. (i.e. the 2nd Tuesday of each month)

Daily Average - the total discharge by weight or in other appropriate units as specified herein, during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges in appropriate units as specified herein divided by the number of days during the calendar month when the measurements were made.

Daily Maximum - the total discharge by weight or in other appropriate units as specified herein, during any calendar day.

Net - the amount of a pollutant contained in the discharge measured in appropriate units as specified herein, less the amount of a pollutant contained in the surface water body intake source, measured in the same units, over the same period of time.

1. The intake source must be the same water body that is being discharged to.

2. In cases where the surface water body intake source is pretreated for the removal of pollutants, the intake level of a pollutant to be used in calculating the net, is that level contained after the pretreatment steps.

Composite - a combination of individual (or continuously taken) samples obtained at regular intervals over the entire discharge day. The volume of each sample shall be proportional to the discharge flow rate. For a continuous discharge, a minimum of 24 individual grab samples (at hourly intervals) shall be collected and combined to constitute a 24-hour composite sample. For intermittent discharges of 4 - 8 hours duration, grab samples shall be taken at a minimum of 30 minute intervals. For intermittent discharges of less than 4 hours duration grab samples shall be taken at a minimum of 15 minute intervals.

Gross - the poundage contained in the discharge. (Gross applies when the intake source is a municipal or private water supply, ground water, or a surface water body other than the one being discharged to.)

Grab - An individual sample collected in less than 15 minutes.

Mutiple Grab - Individual samples obtained at regular intervals over the entire discharge day. The volume of each sample shall be proportional to the discharge flow rate. For a continuous discharge, a minimum of four individual grab samples (at 6-hour intervals) shall be collected. For intermittent discharges of 4-8 hours duration, grab samples shall be taken at a minimum of 2-hour intervals. For intermittent discharges of less than 4 hours duration, grab samples shall be taken at a minimum of one-hour intervals.

This permit and the authorization to discharge shall be binding upon the permittee and any successors in interest of the permittee and shall expire at midnight on January 31, 1980. The permittee shall not discharge after the above date of expiration. In order to receive authorization to discharge beyond the above date of expiration, the permittee shall submit such information, forms, and fees as are required by the agency authorized to issue NPDES permits no later than 180 days prior to the above date of expiration.

By authority of

Gerald M. Hansler, P.E.
(Regional Administrator)

November 21, 1974
(Date)

Meyer Scolnick
(Signature)

Meyer Scolnick, Director
Water Enforcement Branch
Enforcement and Regional
Counsel Division

MCO 5357757

c

Monsanto

MONSANTO INDUSTRIAL CHEMICALS CO.
800 N. Lindbergh Boulevard
St. Louis, Missouri 63186
Phone: (314) 894-1000

March 11, 1977

Mr. Robert B. Schaffer, Director
Effluent Guidelines Division (WH-552)
U. S. Environmental Protection Agency
401 M Street, S. W.
Washington, D. C. 20460

SUBJECT: Non-Fertilizer Phosphate Guidelines - 308 Letter

Dear Mr. Schaffer:

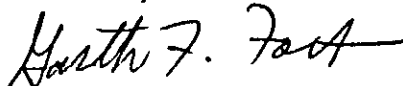
The enclosed "Data Collection Portfolio", with attachments, is submitted in response to your January, 1977 memorandum requesting information pursuant to Section 308 of the Federal Water Pollution Control Act on certain non-fertilizer phosphate chemical operations.

This response covers the Monsanto Company Plant at Kearny, New Jersey. Additional responses for eight other Monsanto locations are being forwarded under separate copies.

We have chosen not to mark any of the included information as "Trade Secret and Confidential", but we feel that publication of some of the data, like production numbers, would be detrimental to the free enterprise system. Recognizing your needs, we simply request your reflection on how this data will be handled.

With the time allowed, we have, to the best of our knowledge, supplied all readily available information pertinent to your request.

Sincerely,



Garth F. Fort
Manager
Environmental Protection

GFF:ms

encs. (3)

Corporation Monsanto
Plant Kearny
City Kearny State N.J.

NONFERTILIZER PHOSPHATE CHEMICALS

PART I - GENERAL INFORMATION

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U.S. EPA (WH-552)
Washington, D. C. 20460

1. Name of Corporation
MONSANTO INDUSTRIAL CHEMICAL COMPANY
2. Address of Corporation Headquarters
Street: 800 N. LINDBERGH BLVD.
City: ST. LOUIS
State: MISSOURI Zip Code 63166
3. Name of Plant
KEARNY PLANT
4. Address of Plant
Street: PENNSYLVANIA AVENUE
City: KEARNY
State: NEW JERSEY Zip Code 07032
5. Name(s) of corporation personnel to be contacted for information pertaining to this data collection portfolio.

| <u>Name</u> | <u>Title</u> | <u>(Area Code) Telephone</u> |
|----------------------|--------------------------------|------------------------------|
| <u>G.F. FORT</u> | <u>ENV. MGR.</u> | <u>(314) 694-2648 2456</u> |
| <u>D.M. WIDDOWS</u> | <u>CHIEF CHEMIST</u> | <u>(201) 589-0350</u> |
| <u>R.F. HARTMANN</u> | <u>ENG. & MAINT. SUPT.</u> | <u>(201) 589-0350</u> |
6. Plant NPDES Permit Number(s) None
Date of expiration -
If no permit, application number None
Date of application --

Corporation Monsanto
Plant Kearny
City Kearny State N.J.

7. Products produced at this plant site.

Indicate which of the products shown in list 1 (Nonfertilizer Phosphate Chemicals - page 3) that you produce at this site and the production rate during the period January 1, 1975 to October 31, 1976. If there is more than one process type for a given product, identify and list each separately.

[illegible]

Attach additional pages, if necessary.

MCWANE COMPANY
PENNSYLVANIA AVENUE
KERRY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

NONFERTILIZER PHOSPHATE CHEMICALS

PART II - WATER USE, RE-USE, AND DISCHARGE

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U.S. EPA (WH-552)
Washington, D. C. 20460

1. Water Use and Disposition: Total Plant Needs During the Period
January 1, 1975 to October 31, 1976

For each process at your plant producing a product identified in List 1 in Part I, list the sources and quantities of water used in the process and describe the disposition of wastewaters. If a time period of less than January 1, 1975 to October 31, 1976 is used, state the reason for the shorter period or state that the values used are representative of that period. Use a separate sheet for each product (or process where more than one process is used at the plant to produce a particular product). Where values are not known for individual products, groupings of products may be used which give the greatest amount of detail available.

Product(s) Phosphoric Acid

Process(es) _____

A. Water Source:

| | | | <u>Time Period</u> <u>of Calculation</u> |
|-----------------|--------------|---------------------|---|
| Municipal | <u>0.215</u> | mgd (average value) | _____ |
| Surface | _____ | mgd | _____ |
| Ground | _____ | mgd | _____ |
| Other (specify) | _____ | mgd | _____ |

B. Uses:

| | | | |
|--|--------------|-----|-------|
| Non-contact cooling | <u>0</u> | mgd | _____ |
| Direct process contact (as diluent, solvent, carrier, reactant, by-product, cooling, etc.) | <u>0.191</u> | mgd | _____ |
| Indirect process contact (pumps, seals, etc.) | _____ | mgd | _____ |
| Non-contact ancillary uses (boilers, utilities, etc.) | _____ | mgd | _____ |

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

Maintenance, equipment cleaning
and work area washdown _____ mgd
Air pollution control _____ mgd
Sanitary and potable _____ mgd
Other (specify) Return Phos- 0.014 mgd
phorus Cars _____

C. Source of Wastewater Flows:

Non-contact cooling _____ mgd
→ Direct process contact 0.010 mgd
Indirect process contact _____ mgd
Non-contact ancillary uses _____ mgd
Maintenance, equipment cleaning
and work area washdown _____ mgd
Air pollution control _____ mgd
Sanitary/Potable water _____ mgd
Storm water (collected in
treatment system) _____ mgd
Other (specify) _____ mgd

D. Process Wastewater Discharged to:

Surface water or storm sewer
Treated _____ mgd
Untreated _____ mgd
Municipal Sewage Treatment Plant _____ mgd
Deep well _____ mgd
Other (Specify and describe 0.010 mgd
briefly) Internal Recycle System - Waste water used in
another process.

If process wastewater is discharged to a municipal treatment
plant, answer the following questions:

Name of Treatment Plant _____

City _____ State _____

Is discharge to municipal sewage treatment plant pretreated?

____ Yes ____ No

If yes, describe pretreatment _____

If discharge to surface water, what is the name of the
receiving water? _____

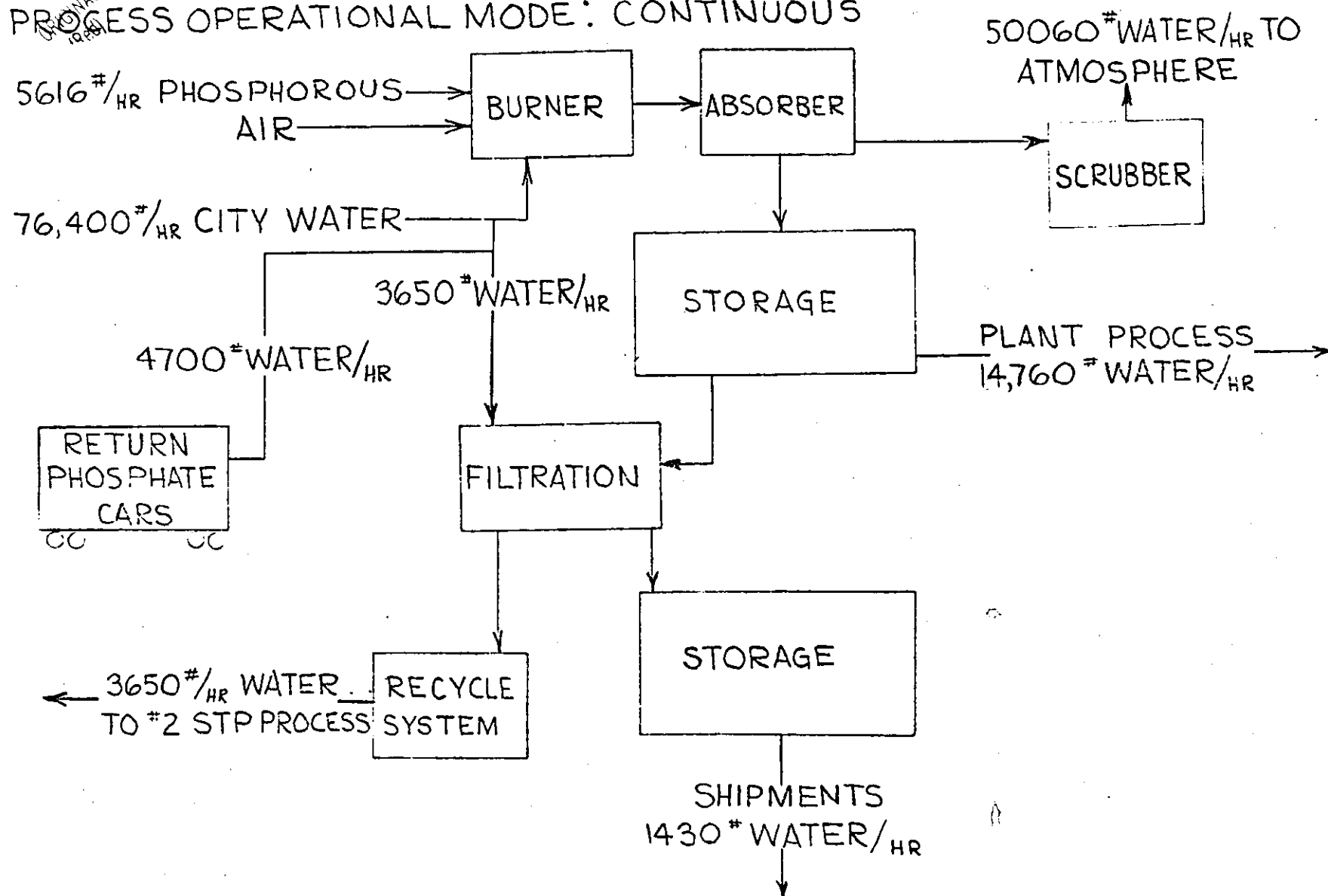
2. Water Reuse:

MCO 6475400

PRODUCT: PHOSPHORIC ACID

PROCESS: BURN ELEMENTAL PHOSPHOROUS AND ADDITION OF WATER

PROCESS OPERATIONAL MODE: CONTINUOUS



ROBERTO COMPANY
PENNSYLVANIA AVENUE
HEARNY, N. J. LIST 7032

Corporation _____
Plant _____
City _____ State _____

NONFERTILIZER PHOSPHATE CHEMICALS

Elemental phosphorus

Dry process or furnace phosphoric acid

Phosphorus pentoxide (P_2O_5)

Phosphorus pentasulfide (P_2S_5)

Phosphorus trichloride (PCl_3)

Phosphorus oxychloride ($POCl_3$)

Calcium phosphates (e.g., MCP, DCP, TCP, calcium pyrophosphate)

Sodium phosphates (e.g., MSP, DSP, TSP, chlorinated TSP,

sodium aluminum phosphate, sodium hexametaphosphate,

sodium tetraphosphate, amorphous and crystalline sodium

metaphosphates, tetrasodium pyrophosphate, sodium tripolyphosphate)

Potassium phosphates (e.g., MKP, DKP, TKP, tetrapotassium

pyrophosphate, potassium tripolyphosphate)

Ammonium phosphates (e.g., MAP, DAP)

Defluorinated phosphate rock

Defluorinated phosphoric acid

For calcium, sodium, potassium, and ammonium phosphates, list each individual compound separately and provide detailed information only for those phosphates produced in excess of 1,000,000 lbs per year.

Include all grades of phosphate products, including technical, food, and feed g

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N.J. 07030

Corporation _____
Plant _____
City _____ State _____

8. For each product indicated in response to Question 7 of Part 1, attach a process flow diagram which identifies the unit operations involved in each product manufacturing process and all sources and quantities of waste waters from the process operations. Show recycle loops for both process water and non-contact cooling water and specify the blowdown control systems. Indicate raw materials used and contact and non-contact water entering each operation. Identify both wet and dry air pollution control devices associated with the process and quantify air flows and wastewater streams from each device. Use consistent units throughout; for example, gallons per hour or pounds per hour. Supplement the diagram with a narrative description for clarity or completeness where necessary. An illustrative example flow diagram is presented on page 5 for your convenience.

The respondent may use process flow diagrams from EPA Development Documents if representative of the process. The process diagrams should be modified to include all requested information.

On each process flow diagram, clearly state whether the process operational mode is batch, continuous or other. If the answer is "other" the operational mode should be specified. If the process is batch or semi-continuous, describe the length of cycle and frequency.

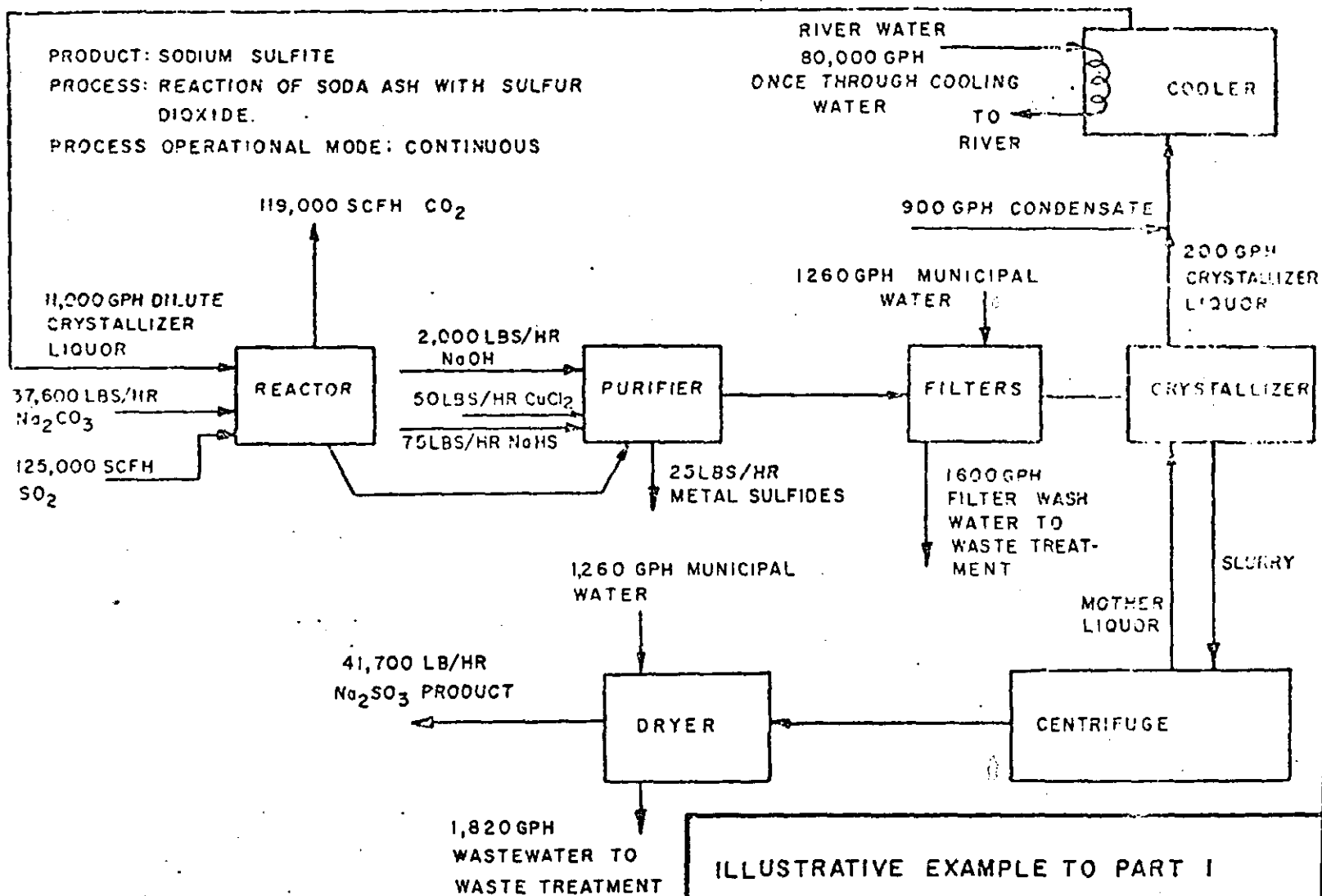
9. Describe major process modifications made (to each process described in response to Question 8) since January 1, 1972 that significantly affect either the volume of flow, or the amount of waste water pollutants per unit of production originating from that process. Explain the purpose behind each of these modifications. Give your best estimate as to the technological age of each process installation as it now exists.

No major process modifications.

10. Please supply list of other products made at this same site. Provide annual production for all inorganic phosphorus compounds.

| | | |
|--------------------------|-----------------------|----------------------------------|
| Phosphoric Acid | 90 x 10 ⁶ | (P ₂ O ₅) |
| Sodium Tripoly Phosphate | 115 x 10 ⁶ | lbs/yr |
| Tetrapotassium Phosphate | 14 x 10 ⁶ | lbs/yr |
| Trimeta Phosphate | 3 x 10 ⁶ | lbs/yr |
| Alkylphenol | ----- | |
| Sterox | ----- | |

PRODUCT: SODIUM SULFITE
 PROCESS: REACTION OF SODA ASH WITH SULFUR
 DIOXIDE.
 PROCESS OPERATIONAL MODE: CONTINUOUS



ILLUSTRATIVE EXAMPLE TO PART I
 QUESTION 8

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

NONFERTILIZER PHOSPHATE CHEMICALS

PART II - WATER USE, RE-USE, AND DISCHARGE

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U.S. EPA (WH-552)
Washington, D. C. 20460

1. Water Use and Disposition: Total Plant Needs During the Period
January 1, 1975 to October 31, 1976

For each process at your plant producing a product identified in List 1 in Part I, list the sources and quantities of water used in the process and describe the disposition of wastewaters. If a time period of less than January 1, 1975 to October 31, 1976 is used, state the reason for the shorter period or state that the values used are representative of that period. Use a separate sheet for each product (or process where more than one process is used at the plant to produce a particular product). Where values are not known for individual products, groupings of products may be used which give the greatest amount of detail available.

Product(s) Sodium Tripoly Phosphate

Process(es) #1 Unit

A. Water Source:

| | | | <u>Time Period of Calculation</u> |
|-----------------|--------------|---------------------|---------------------------------------|
| Municipal | <u>0.025</u> | mgd (average value) | _____ |
| Surface | _____ | mgd | _____ |
| Ground | _____ | mgd | _____ |
| Other (specify) | <u>0.028</u> | mgd | _____ |
| Process Acid | | | |

B. Uses:

| | | | |
|--|--------------|-----|-------|
| Non-contact cooling | _____ | mgd | _____ |
| Direct process contact (as diluent, solvent, carrier, reactant, by-product, cooling, etc.) | <u>0.028</u> | mgd | _____ |
| Indirect process contact (pumps, seals, etc.) | _____ | mgd | _____ |
| Non-contact ancillary uses (boilers, utilities, etc.) | <u>0.021</u> | mgd | _____ |

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

| | | |
|---------------------------------|--------|-----|
| Maintenance, equipment cleaning | | |
| and work area washdown | 0.0007 | mgd |
| Air pollution control | 0.0033 | mgd |
| Sanitary and potable | | mgd |
| Other (specify) | | mgd |

C. Source of Wastewater Flows:

| | | |
|---------------------------------|--------|-----|
| Non-contact cooling | 0.021 | mgd |
| Direct process contact | | mgd |
| Indirect process contact | | mgd |
| Non-contact ancillary uses | | mgd |
| Maintenance, equipment cleaning | | |
| and work area washdown | 0.0007 | mgd |
| Air pollution control | 0.0033 | mgd |
| Sanitary/Potable water | | mgd |
| Storm water (collected in | | |
| treatment system) | | mgd |
| Other (specify) | | mgd |

D. Process Wastewater Discharged to:

| | | |
|----------------------------------|-------|-----|
| Surface water or storm sewer | | |
| Treated | | mgd |
| Untreated | | mgd |
| Municipal Sewage Treatment Plant | | mgd |
| Deep well | | mgd |
| Other (Specify and describe | 0.025 | mgd |
| briefly) Internal Recycle System | | |

If process wastewater is discharged to a municipal treatment plant, answer the following questions:

Name of Treatment Plant _____

City _____ State _____

Is discharge to municipal sewage treatment plant pretreated?

____ Yes ____ No

If yes, describe pretreatment _____

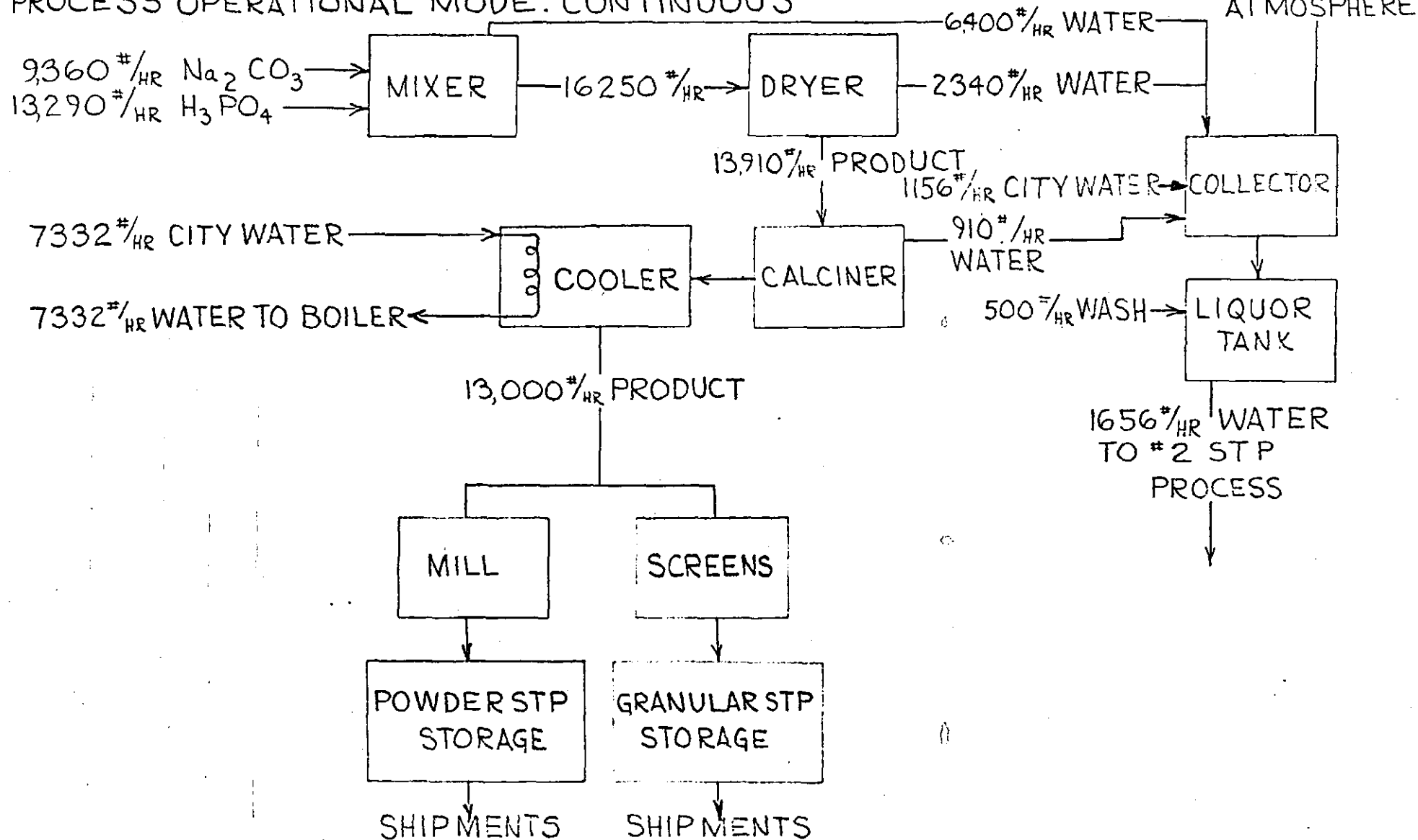
If discharge to surface water, what is the name of the receiving water? _____

2. Water Reuse:

PRODUCT: SODIUM TRIPOLY PHOSPHATE #1

PROCESS: REACTION OF PHOSPHORIC ACID WITH SODIUM CARBONATE AND
CALCINE

PROCESS OPERATIONAL MODE: CONTINUOUS



MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

NONFERTILIZER PHOSPHATE CHEMICALS

PART II - WATER USE, RE-USE, AND DISCHARGE

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U.S. EPA (WH-552)
Washington, D. C. 20460

1. Water Use and Disposition: Total Plant Needs During the Period
January 1, 1975 to October 31, 1976

For each process at your plant producing a product identified in List 1 in Part I, list the sources and quantities of water used in the process and describe the disposition of wastewaters. If a time period of less than January 1, 1975 to October 31, 1976 is used, state the reason for the shorter period or state that the values used are representative of that period. Use a separate sheet for each product (or process where more than one process is used at the plant to produce a particular product). Where values are not known for individual products, groupings of products may be used which give the greatest amount of detail available.

Sodium Tripoly Phosphate
Product(s) & Trimeta Phosphate

Process(es) #2 Unit

A. Water Source:

| | | Time Period of Calculation |
|-----------------|----------------------------------|-------------------------------|
| Municipal | <u>0.059</u> mgd (average value) | _____ |
| Surface | _____ mgd | _____ |
| Ground | _____ mgd | _____ |
| Other (specify) | _____ mgd | _____ |
| Process Acid | <u>0.043</u> | _____ |

B. Uses: Recycle 0.027

| | | |
|--|------------------|-------|
| Non-contact cooling | _____ mgd | _____ |
| Direct process contact (as diluent, solvent, carrier, reactant, by-product, cooling, etc.) | <u>0.129</u> mgd | _____ |
| Indirect process contact (pumps, seals, etc.) | _____ mgd | _____ |
| Non-contact ancillary uses (boilers, utilities, etc.) | _____ mgd | _____ |

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

Maintenance, equipment cleaning

and work area washdown

_____ mgd

Air pollution control

_____ mgd

Sanitary and potable

_____ mgd

Other (specify)

_____ mgd

C. Source of Wastewater Flows:

Non-contact cooling

_____ mgd

Direct process contact

_____ mgd

Indirect process contact

_____ mgd

Non-contact ancillary uses

_____ mgd

Maintenance, equipment cleaning

and work area washdown

_____ mgd

Air pollution control

_____ mgd

Sanitary/Potable water

_____ mgd

Storm water (collected in
treatment system)

_____ mgd

Other (specify)

_____ mgd

D. Process Wastewater Discharged to:

Surface water or storm sewer

Treated

_____ mgd

Untreated

_____ mgd

Municipal Sewage Treatment Plant

_____ mgd

Deep well

_____ mgd

Other (Specify and describe

_____ mgd

briefly) *EMERGENCY OVERFLOW*

TO "FRENCH DRAIN" - ONCE IN FOUR YEARS. FRENCH DRAIN IS DEVICE TO
If process wastewater is discharged to a municipal treatment GROUND plant, answer the following questions:

Name of Treatment Plant _____

City _____

State _____

Is discharge to municipal sewage treatment plant pretreated?

____ Yes

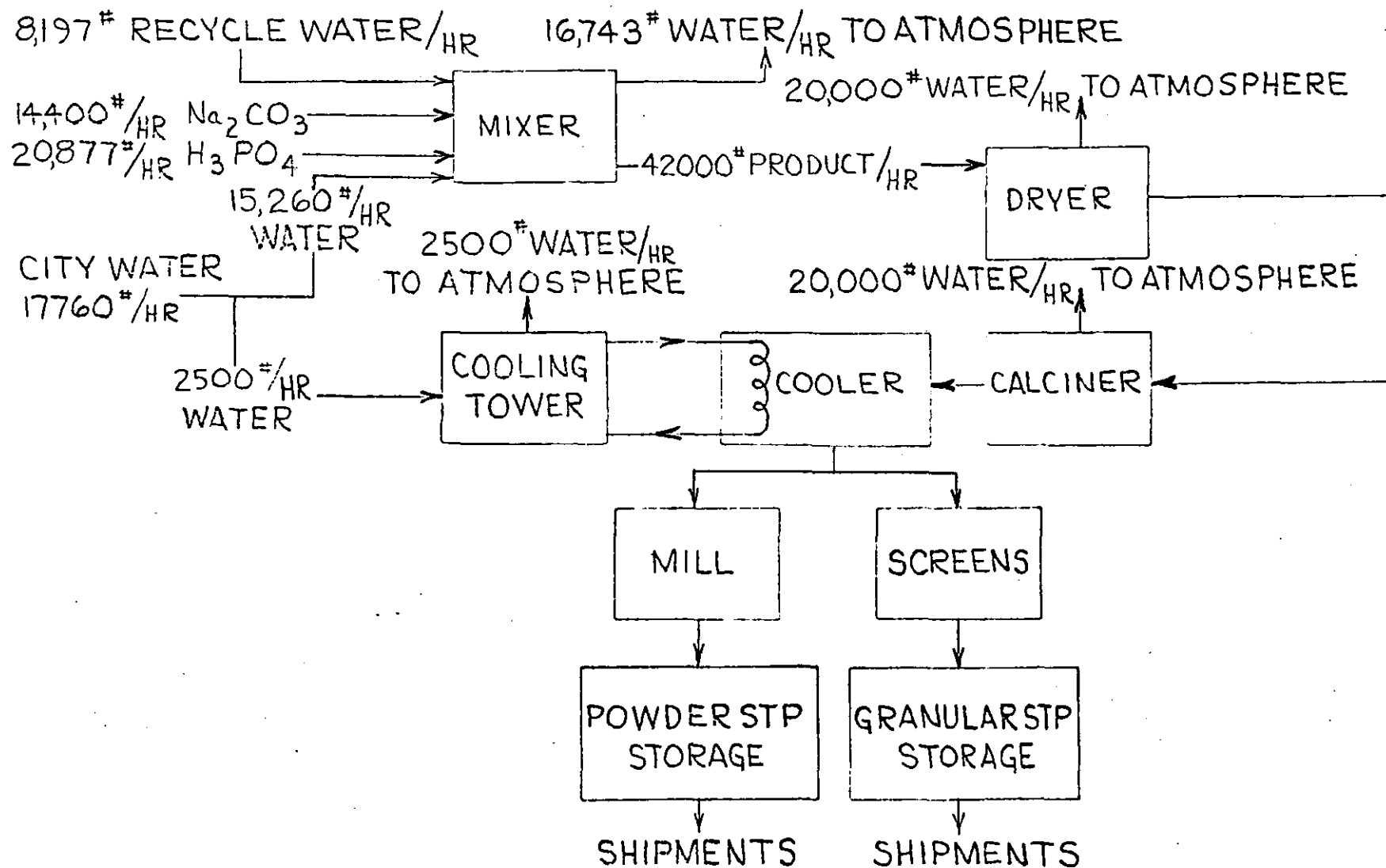
____ No

If yes, describe pretreatment _____

If discharge to surface water, what is the name of the
receiving water? _____

2. Water Reuse:

PRODUCT: SODIUM TRIPOLY PHOSPHATE #2 AND TRIMETA PHOSPHATE
PROCESS: REACTION OF PHOSPHORIC ACID WITH SODIUM CARBONATE AND
CALCINE
PROCESS OPERATIONAL MODE: CONTINUOUS



MURPHY'S CORP.
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

NONFERTILIZER PHOSPHATE CHEMICALS

PART II - WATER USE, RE-USE, AND DISCHARGE

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U.S. EPA (WH-552)
Washington, D. C. 20460

1. Water Use and Disposition: Total Plant Needs During the Period
January 1, 1975 to October 31, 1976

For each process at your plant producing a product identified in List 1 in Part I, list the sources and quantities of water used in the process and describe the disposition of wastewaters. If a time period of less than January 1, 1975 to October 31, 1976 is used, state the reason for the shorter period or state that the values used are representative of that period. Use a separate sheet for each product (or process where more than one process is used at the plant to produce a particular product). Where values are not known for individual products, groupings of products may be used which give the greatest amount of detail available.

Product(s) Tetra Potassium Phosphate

Process(es) _____

A. Water Source:

| | | | <u>Time Period</u> <u>of Calculation</u> |
|-----------------|--------------|---------------------|---|
| Municipal | <u>0.011</u> | mgd (average value) | _____ |
| Surface | _____ | mgd | _____ |
| Ground | _____ | mgd | _____ |
| Other (specify) | _____ | mgd | _____ |
| Process Acid | <u>0.031</u> | | |

B. Uses:

| | | | |
|--|--------------|-----|-------|
| Non-contact cooling | _____ | mgd | _____ |
| Direct process contact (as diluent, solvent, carrier, reactant, by-product, cooling, etc.) | <u>0.042</u> | mgd | _____ |
| Indirect process contact (pumps, seals, etc.) | _____ | mgd | _____ |
| Non-contact ancillary uses (boilers, utilities, etc.) | _____ | mgd | _____ |

NEW JERSEY DEPARTMENT OF
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

Maintenance, equipment cleaning _____
and work area washdown 7 mgd
Air pollution control _____ mgd
Sanitary and potable _____ mgd
Other (specify) _____ mgd

C. Source of Wastewater Flows:

Non-contact cooling NA mgd
Direct process contact _____ mgd
Indirect process contact _____ mgd
Non-contact ancillary uses _____ mgd
Maintenance, equipment cleaning _____
and work area washdown _____ mgd
Air pollution control _____ mgd
Sanitary/Potable water _____ mgd
Storm water (collected in
treatment system) _____ mgd
Other (specify) _____ mgd

D. Process Wastewater Discharged to:

Surface water or storm sewer NA
Treated _____ mgd
Untreated _____ mgd
Municipal Sewage Treatment Plant _____ mgd
Deep well _____ mgd
Other (Specify and describe
briefly) _____ mgd

If process wastewater is discharged to a municipal treatment
plant, answer the following questions:

Name of Treatment Plant NA
City _____ State _____

Is discharge to municipal sewage treatment plant pretreated?

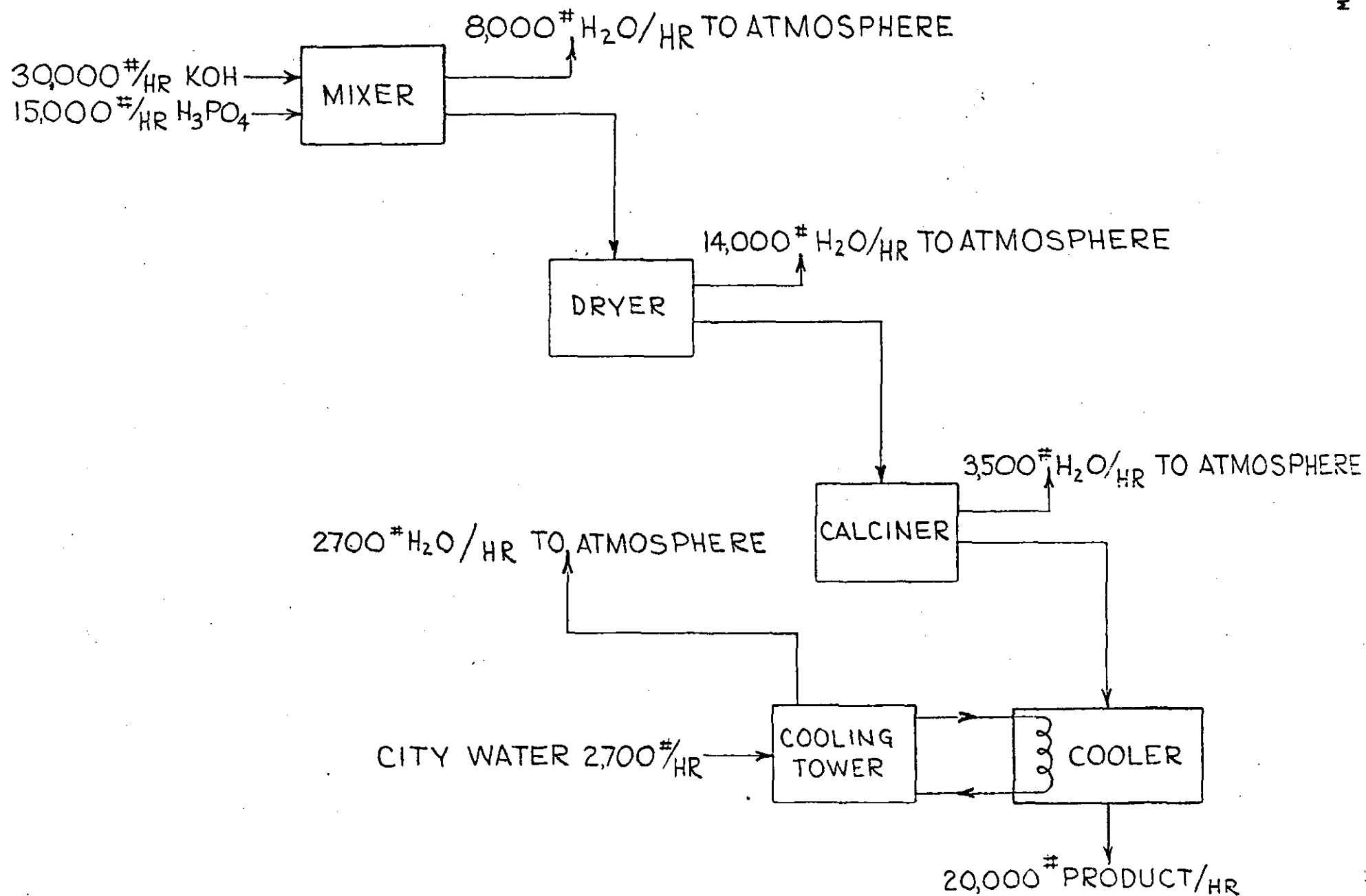
 Yes No

If yes, describe pretreatment _____

If discharge to surface water, what is the name of the
receiving water? _____

2. Water Reuse:

PRODUCT: TETRA POTASSIUM PYROPHOSPHATE
PROCESS: REACTION KOH WITH H_3PO_4 AND CALCINE
PROCESS OPERATIONAL MODE: CONTINUOUS



| | |
|--------------------|-------------------|
| Corporation | <u>Monsanto</u> |
| Plant | <u>Kearny</u> |
| City <u>Kearny</u> | State <u>N.J.</u> |

WASTE WATER RECYCLE SYSTEM:

The Kearny Plant has an internal waste water recycle system which collects the waste water from the acid purification operation and all washings in the #1 and #2 Phosphate Plants. This water is then used as make-up water in the sodium tripoly phosphate process. The recycle system is shown on the process diagrams.

IRONMOUNT COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

Attach a separate sheet of paper describing each water recirculation and reuse system for the nonfertilizer phosphate chemicals manufactured at your plant (list 1, Part 1, page 3). Include process water and non-contact cooling water. Specify the blowdown control systems in operation (i.e., the volume and percent of blowdown and the basis, such as TDS, chromium, phosphate, pH, temperature, etc.) Attach a flow diagram of the system and identify that portion(s) common to all categories of products manufactured at your plant and that portion(s) specific to only phosphorus derived chemicals.

3. Quality of Water Discharged:

Attach all in-plant and treatment plant influent and effluent water analysis data obtained from January 1, 1975 to October 31, 1976. Include flow rates and all parameters analyzed, such as (but not limited to) COD, TSS, TDS, total phosphorus (as P), acid hydrolyzable phosphate (as P), elemental phosphorus, fluoride, arsenic, sulfate, radium, pH, dissolved silica, sulfites, sulfides, free chlorine, wastewater and ambient air temperature, and significant metals. Clearly describe the location of each sampling point and describe the source(s) of wastewater (e.g., column scrubber, non-contact cooling water blowdown, etc.). Include daily production figures for each product identified in Part I, Question 7.

In addition, summarize the data by completing Tables A, B, C, D and E, as per the instructions which follow. Information regarding influent and effluent waste loads of each wastewater treatment facility is requested in Tables A and C, respectively. Table B requests data on each untreated wastewater discharge point. Table D requests waste loads from each individual production process. If data for individual waste streams is not available, information for combined waste streams should be furnished which represents the greatest degree of detail available. The tables are located at the end of this section.

Instructions for Completing Tables A, B, C, D and E

NA
For Tables A, B, C, D and E, use the following definitions and notes. The period covered should correspond with that used for Part I question 7 to calculate average daily production.

Flow - Do not include rainfall runoff, unless it is collected in the treatment system. If collected,

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

estimate the percent of total flow which is attributed to this source.

Average day - Should represent the average of the data period covered.

Significant parameters - Those potential pollutants not specifically listed, but which are introduced into the waste streams as a result of materials used, product produced, process used and for which you have test data.

Identify all data which results from abnormal operating or other conditions.

If use of a different time period (a portion of the time period January 1, 1975 to October 31, 1976 . results in more adequate representation of the pollution loads, you may do so if the time period is not less than six months. You should specify the time period and explain why that period is more representative.

Table A - Complete Table A for the combined influent to each treatment facility.

Table B - Complete Table B for each untreated waste discharge point (to surface waters, deep wells, land application, etc.)

NA
Table C - Complete Table C for the treated effluent from each treatment facility. Not applicable to plants that have not yet installed waste treatment facilities. This section is not restricted by type of treatment.

Table D - Complete Table D for the process wastewaters from each of the product/process lines identified in Part I, item 7. Do not include non-contact cooling waters but do include all contact cooling waters. If measured values are not known or not available, supply the best estimate available and specify the basis for the estimate. The production basis should be the same as the average daily production while operating that was given in Part I.

Table E - Complete for the plant intake water.

4. The method of sample collection for the data supplied in response to Question 2, Tables A, B, C, D and E, should

Corporation _____
Plant _____
City _____ State _____

5. Indicate all parameters listed in Part II, tables A through E, which were not measured by EPA approved methods.

methods.

_____ Yes _____ No

A _____ sewage treatment plant
B _____ plant treatment facility
C _____ laboratory acclimation
D _____ other explain _____

Not Applicable

WILMINGTON UNIVERSITY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

7. Do leaks of process wastewater or materials into non-contact cooling water occur?

____ Yes X No

If yes, complete the following:

- (a) Is data based on:

____ (A) Records

____ (B) Best Estimate, Basis _____

(b) Source of Leaks _____

(c) Frequency _____

(d) Quantity Leaked _____ gallon/day

(e) Material(s) Leaked _____

(f) Average Duration of Shutdown for Repair _____ days

8. Do start-up and/or shutdown operations adversely affect wastewater volume and characteristics?

____ Yes X No

If yes, complete the following:

(a) Identify affected waste streams _____

(b) Describe the quantitative and qualitative changes in the wastewater _____

(c) Average number of start-ups/shutdowns per month _____

(d) Average duration of start-ups _____ hours

MONSANTO COMPANY

PENNSYLVANIA AVENUE

KEARNY, N. J. 07032

Corporation _____

Plant _____

City _____

State _____

(e) Average duration of shutdowns _____ hours

(f) Are by-pass or equalization facilities available for these
wastewaters?

____ Yes

X No

If yes, explain _____

TABLE A

WASTE LOADS TO TREATMENT FACILITIES

Corporation N/A

Plant _____

City _____ State _____

Treatment Facility Name _____

Treatment Facility Description _____

Wastewater Source(s) _____

| Parameter | Daily | | | Monthly Averages | | Remarks |
|---|---------|---------|---------|------------------|---------|---------|
| | Minimum | Average | Maximum | Minimum | Maximum | |
| Flow (MGD) | | | | | | |
| pH (pH units) | | | | | | |
| Temperature (°C) - Wastewater | | | | | | |
| Temperature (°C) - Ambient Air | | | | | | |
| BOD ₅ (lbs/day)* | | | | | | |
| COD (lbs/day)** | | | | | | |
| TSS (lbs/day) | | | | | | |
| TDS (lbs/day) | | | | | | |
| Chlorine, free (lbs/day)*** | | | | | | |
| Fluoride (lbs/day) | | | | | | |
| Acid hydrolyzable phosphate as P (lbs/day) | | | | | | |
| Total P as P (lbs/day) | | | | | | |
| Elemental phosphorus (lbs/day) | | | | | | |
| Sulfide (lbs/day)* | | | | | | |
| Elemental Sulfur (lbs/day)* | | | | | | |
| Sulfate (lbs/day) | | | | | | |
| Chloride (lbs/day)*** | | | | | | |
| Significant Metals (Identify) | | | | | | |
| As (lbs/day) | | | | | | |
| Cd (lbs/day) | | | | | | |
| Ra (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| Others (Identify) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |

* Recommended only for phosphorus pentasulfide waste water.

** Not recommended for phosphorus trichloride and phosphorus oxychloride production waste water.

***Recommended only for phosphorus trichloride and phosphorus oxychloride production waste water.

TABLE B
UNTREATED WASTE LOAD DISCHARGED

Corporation N/A
Plant _____
City _____ State _____
Discharge Point _____
NPDES Discharge No. _____
Wastewater Source(s) _____

| Parameter | Daily | | | Monthly | | Remarks |
|---|---------|---------|---------|---------|---------|---------|
| | Minimum | Average | Maximum | Minimum | Maximum | |
| Flow (MGD) | | | | | | |
| pH (pH units) | | | | | | |
| Temperature (°C) - Wastewater | | | | | | |
| Temperature (°C) - Ambient Air | | | | | | |
| ESDS (lbs/day)* | | | | | | |
| CS (lbs/day)** | | | | | | |
| TSS (lbs/day) | | | | | | |
| TDS (lbs/day) | | | | | | |
| Chlorine, free (lbs/day)*** | | | | | | |
| Fluoride (lbs/day) | | | | | | |
| Acid hydrolyzable phosphate as P (lbs/day) | | | | | | |
| Total P as P (lbs/day) | | | | | | |
| Elemental phosphorus (lbs/day) | | | | | | |
| Sulfide (lbs/day)* | | | | | | |
| Elemental Sulfur (lbs/day)* | | | | | | |
| Sulfate (lbs/day) | | | | | | |
| Chloride (lbs/day)*** | | | | | | |
| Significant Metals (Identify) | | | | | | |
| As (lbs/day) | | | | | | |
| Cd (lbs/day) | | | | | | |
| Ra (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| Others (Identify) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |

- * Recommended only for phosphorus pentasulfide waste water.
- ** Not recommended for phosphorus trichloride and phosphorus oxychloride production waste water.
- *** Recommended only for phosphorus trichloride and phosphorus oxychloride production waste water.

TABLE C
TREATED WASTE LOAD DISCHARGED

Corporation N/A Discharge Point _____
Plant _____ NPDES Discharge No. _____
City _____ State _____ Treatment Facility _____
Treatment Facility Description _____

Do you post-chlorinate this effluent? ☐ Yes If yes, do you chlorinate ☐ (A) Full-Time
☐ No ☐ (B) Part-Time

Explain _____

| Parameter | Daily | | | Monthly Averages | | Remarks |
|--------------------------------|---------|---------|---------|------------------|---------|---------|
| | Minimum | Average | Maximum | Minimum | Maximum | |
| Flow (MGD) | | | | | | |
| pH (pH units) | | | | | | |
| Temperature (°C) - Wastewater | | | | | | |
| Temperature (°C) - Ambient Air | | | | | | |
| BOD ₅ (lbs/day)* | | | | | | |
| COD (lbs/day)** | | | | | | |
| TSS (lbs/day) | | | | | | |
| TDS (lbs/day) | | | | | | |
| Chlorine, free (lbs/day)*** | | | | | | |
| Fluoride (lbs/day) | | | | | | |
| Acid hydrolyzable | | | | | | |
| phosphate as P (lbs/day) | | | | | | |
| Total P as P (lbs/day) | | | | | | |
| Elemental phosphorus (lbs/day) | | | | | | |
| Sulfide (lbs/day)* | | | | | | |
| Elemental Sulfur (lbs/day)* | | | | | | |
| Sulfate (lbs/day) | | | | | | |
| Chloride (lbs/day)*** | | | | | | |
| Significant Metals (Identify) | | | | | | |
| As (lbs/day) | | | | | | |
| Cd (lbs/day) | | | | | | |
| Ra (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| Others (Identify) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |
| _____ (lbs/day) | | | | | | |

* Recommended only for phosphorus pentasulfide waste water.

** Not recommended for phosphorus trichloride and phosphorus oxychloride production waste water.

*** Recommended only for phosphorus trichloride and phosphorus oxychloride production waste water.

TABLE D
PRODUCT/PROCESS LINES WASTE LOADS

Corporation N/A
Plant _____
City _____ State _____
Product _____
Process _____

| Parameter | Daily | | | Monthly Averages | | Remarks |
|-------------------------------------|---------|---------|---------|------------------|---------|---------|
| | Minimum | Average | Maximum | Minimum | Maximum | |
| Flow (gal/1,000 lbs)**** | | | | | | |
| pH (pH units) | | | | | | |
| Temperature (°C) - Wastewater | | | | | | |
| Temperature (°C) - Ambient Air | | | | | | |
| BOD ₅ (lbs/1,000 lbs)* | | | | | | |
| COD (lbs/1,000 lbs)***** | | | | | | |
| TSS (lbs/1,000 lbs) | | | | | | |
| TDS (lbs/1,000 lbs) | | | | | | |
| Chlorine, free (lbs/1,000 lbs)*** | | | | | | |
| Fluoride (lbs/1,000 lbs) | | | | | | |
| Acid hydrolyzable | | | | | | |
| phosphate as P (lbs/1,000 lbs) | | | | | | |
| Total P as P (lbs/1,000 lbs) | | | | | | |
| Elemental phosphorus(lbs/1,000 lbs) | | | | | | |
| Sulfide (lbs/1,000 lbs)* | | | | | | |
| Elemental Sulfur (lbs/1,000 lbs)* | | | | | | |
| Sulfate (lbs/1,000 lbs) | | | | | | |
| Chloride (lbs/1,000 lbs)*** | | | | | | |
| Significant Metals (Identify) | | | | | | |
| As (lbs/1,000 lbs) | | | | | | |
| Cd (lbs/1,000 lbs) | | | | | | |
| Ra (lbs/1,000 lbs) | | | | | | |
| _____ (lbs/1,000 lbs) | | | | | | |
| _____ (lbs/1,000 lbs) | | | | | | |
| Others (Identify) | | | | | | |
| _____ (lbs/1,000 lbs) | | | | | | |
| _____ (lbs/1,000 lbs) | | | | | | |
| _____ (lbs/1,000 lbs) | | | | | | |
| _____ (lbs/1,000 lbs) | | | | | | |

- * Recommended only for phosphorus pentasulfide waste water.
- ** Not recommended for phosphorus trichloride and phosphorus oxychloride production waste water.
- ***Recommended only for phosphorus trichloride and phosphorus oxychloride production waste water.
- ****Indicates gallons discharged (per 1,000 pounds of production).
- *****Indicates pounds discharged (per 1,000 pounds of production).

PART 11 - PAGE 11

MCO 6475420

*1 -- Typical analysis of city water as supplied to the Kearny Plant by the North New Jersey District Water Supply Company.

TABLE E
PLANT INTAKE WATER

Corporation Monsanto
Plant Kearny
City Kearny State N. J.

| Parameter | Daily | | | Monthly Averages | | Remarks |
|--|---------|---------|---------|------------------|---------|---------|
| | Minimum | Average | Maximum | Minimum | Maximum | |
| Flow (MGD) | | | | | | |
| pH (pH units) | | | | 8.1 | 8.5 | *1 |
| Temperature (°C) - Wastewater | | | | | | |
| Temperature (°C) - Ambient Air | | | | 8 | 25 | *1 |
| BOD ₅ (lbs/day)* <i>Not Rec</i> | | | | 1 | 26 | *1 |
| COD (lbs/day)** PPM | | | | - | 5 | *1 |
| TSS (lbs/day) } TS PPM | | | | - | 80 | *1 |
| TDS (lbs/day) } | | | | | | |
| Chlorine, free (lbs/day)*** | | | | | | |
| Fluoride (lbs/day) | | | | | | |
| Acid hydrolyzable | | | | | | |
| phosphate as P (lbs/day) | | | | | | |
| Total P as P (lbs/day) | | | | | | |
| Elemental phosphorus (lbs/day) | | | | | | |
| Sulfide (lbs/day)* | | | | | | |
| Elemental Sulfur (lbs/day)* | | | | | | |
| Sulfate (lbs/day) | | | | | | |
| Chloride (lbs/day)*** | | | | | | |
| Significant Metals (Identify) | | | | | | |
| As (lbs/day) | | | | | | |
| Cd (lbs/day) | | | | | | |
| Ra (lbs/day) | | | | | | |
| (lbs/day) | | | | | | |
| (lbs/day) | | | | | | |
| Others (Identify) | | | | | | |
| (lbs/day) | | | | | | |
| (lbs/day) | | | | | | |
| (lbs/day) | | | | | | |
| (lbs/day) | | | | | | |

- * Recommended only for phosphorus pentasulfide waste water.
- ** Not recommended for phosphorus trichloride and phosphorus oxychloride production waste water.
- ***Recommended only for phosphorus trichloride and phosphorus oxychloride production waste water.

PART II - PAGE 12

MCO 6475421

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

NONFERTILIZER PHOSPHATE CHEMICALS

PART III - TREATMENT TECHNOLOGY

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U.S. EPA (WH-552)
Washington, D. C. 20460

A. Do you have a treatment system(s) at this plant?

Yes _____ No X

If yes, complete the following and attach a separate flow sheet for each distinct treatment facility indicating waste streams treated, unit sizes of treatment equipment, ponds of various functions, detention times, recycle rates, effluent concentration or design criteria and other pertinent engineering information for operation of the treatment facility. Include treatment of storm runoff, where applicable. For each treatment facility complete the following:

Name of Facility _____

Source(s) of Waste Water _____

| | <u>Year</u> | <u>Cost (1976 dollars)</u> |
|---|-------------|----------------------------|
| 1 Original installation (battery limits only-do not include cost of land, collecting sewers, in-plant piping, pumping stations, etc.) | _____ | <u>NA</u> |
| 2 Estimated replacement cost | _____ | _____ |
| 3 Estimated total capital expenditure for this facility to date | _____ | _____ |
| 4 Annual cost of operation and maintenance (exclude depreciation and debt service cost) | _____ | _____ |

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

- 5 List major modifications or additions since original installation and state the purpose of the modification or addition.

| <u>Modification-Addition</u> | <u>Treatment Facility</u> | <u>Year</u> | <u>Cost (1976 Dollars)</u> | <u>Purpose of Modification</u> |
|------------------------------|---------------------------|-------------|----------------------------|--------------------------------|
| | | | | |
| | | | | |
| | NA | | | |
| | | | | |
| | | | | |

- 6 List planned or scheduled modifications or additions and estimated date of completion and state the purpose of the modification or addition.

| <u>Modification-Addition</u> | <u>Treatment Facility</u> | <u>Year</u> | <u>Cost (1976 Dollars)</u> | <u>Purpose of Modification</u> |
|------------------------------|---------------------------|-------------|----------------------------|--------------------------------|
| | | | | |
| | | | | |
| | NA | | | |
| | | | | |
| | | | | |

- 7 Is nutrient addition practiced:

___ Yes ___ No

NA

- 8 How many employees (equivalent man-years/year) are primarily engaged as operators of the waste water treatment facility? (exclude maintenance)

NA

How many employees (equivalent man-years/year) are engaged as support personnel for the waste water treatment facility?

- 9 Is an operator always present?

___ Yes ___ No

NA

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KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

10 Quantity of wastewater treatment facility solid wastes disposed
of at present (dry basis) _____ lbs/day

11 Moisture content of waste solids disposed of at present
_____ % moisture

12 Present disposition of solids

NA

13 Estimated annual cost of solids handling and disposal (1976 dollars)
_____ \$/ton dry basis

14 Planned future disposition of solids:

15 Does runoff from solids disposal areas occur?

____ Yes _____ No

16 Is runoff from solids disposal areas collected and treated?

____ Yes _____ No

If yes, describe collection system and fate of collected runoff

17 Does leaching from disposal areas occur?

____ Yes _____ No

If yes, how is this controlled?

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KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

18 What are the total annual energy requirements for the treatment facility?

Electrical _____ Kwhr
Other (e.g. Heat) _____ Btu

NA

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

B. Waste Treatment Ponds

1. Do you use ponds as part of your waste handling or treatment system? _____ If so, provide answers to the following questions.

a. Describe methods used to prevent seepage from ponds. If linings are used, provide information on materials and costs.

b. Do you analyze groundwater samples to monitor percolation from ponds? _____ If so, describe methods and findings, including identities and quantities of pollutants.

c. Provide estimate of water and pollutant losses from pond areas due to overflow during periods of excess rainfall or flooding of low-lying areas. Estimate average quantities of pollutants (in lbs per 1000 lbs of product) discharged in this manner, including elemental phosphorus, total phosphorus, suspended solids, fluoride and arsenic.

d. Describe methods used, if any, to prevent storm water flow to ponds.

NA

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

C. Filtration

Have you done filtration studies on your waste waters
(sand, multi-media, etc.) beyond what was described
in Section A, Part III? _____ Yes _____ No

If yes, give a brief description of the data (source and types of
wastes, period of time covered, process stream involved, extent of
data base and contact personnel suggested) in the space below.

N.A.

D. Biological Treatment

Have biological treatability studies been
conducted on your wastewaters beyond what was
described in Section A, Part III? _____ Yes _____ No

If yes, give a brief description of the data and results (source and
types of wastes treated, duration of the study, extent of data base,
conclusions of study, and contact personnel suggested) in the space below:

NA

INDUSTRIAL DISTRICT
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

E. Have other treatability studies, beyond what was described in Section A, Part III, employing treatment processes such as sedimentation, neutralization, hydrolysis, precipitation, oxidation/reduction, ion exchange, centrifugation, etc., been run on any of the process wastewater streams from the plant?

_____ Yes _____ No

If yes, list on a separate sheet those product/process streams from which such treatability studies were conducted. Identify the sheet as response to III-E.

NA

F. Please indicate any comments that you may have that might be beneficial to the conduct of this study to develop effluent guidelines and standards of performance for the manufacture of phosphorus derived chemicals.

NA

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07632

Corporation _____
Plant _____
City _____ State _____

NONFERTILIZER PHOSPHATE CHEMICALS

PART IV - INFORMATION REQUIRED ON SPECIFIC PRODUCTS

Do not duplicate information already reported in Parts I, II and III, but please indicate where the information is already provided. Provide only data already available.

NOTE: Any of the above requested information that has been supplied to the Effluent Guidelines Division, EPA, in response to requests within the past 24 months need not be repeated, but the recipient and date submitted should be identified.

A check-off list of waste water sources common in phosphate manufacturing also follows to aid plant personnel in providing complete information:

- a) rainwater run-off
 - i. discharged directly to surface waters
 - ii. collected in process waste water treatment systems
- b) maintenance wash water
- c) leaks
- d) spills
- e) floor wash-up water
- f) tank car washings
- g) container washings
- h) non-contact cooling water
- i) boiler blow-down
- j) sanitary wastes
- k) laboratory wastes
- l) safety/fire waters
- m) blow-down from waste water recycle systems
- n) vent scrubber water
- o) loading and packaging area scrubber water
- p) stack scrubber water
- q) supernatant fraction from treatment and sedimentation systems
- r) filtrate fraction from treatment systems
- s) waste water from water supply systems
- t) waste water from steam supply systems
- u) waste water from cooling tower systems
- v) other waste waters
 - i. In the event of a major operation upset, the water from
 - ii. _____ the reclaim tank can be emptied
 - iii. _____ to a french drain.

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

PRODUCT: ELEMENTAL PHOSPHORUS Do Not Produce
AT THIS SITE

1. Do you achieve total recycle of waste water? Yes If not, explain the limitations that prevent recycle. If so, will blowdown from recycle systems be required in the future because of dissolved solids accumulation?

No.

NA

2. Have you maintained operation of treatment ponds and recycle systems during extremely cold weather? Describe any provisions that must be taken to operate these systems during extreme cold. Provide data on additional treatment and recycle costs (capital and operating) incurred because of cold weather.

3. Describe in detail how your plant handles and controls phosphy water.

Do you use isolated sump systems in all areas where elemental phosphorus is handled or processed? Describe the handling and ultimate fate of elemental phosphorus spills.

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

4. Provide available information on the decline of white phosphorus content as phossy water moves through your treatment system.
5. Provide available data on quantities (in lb/1000 lb of P₄) of potentially hazardous substances (F, Cd, Ra, As, U, V) in:
- a. Phosphate ore
 - b. Other raw materials (coke, silica) NA
 - c. Products and by-products (elemental phosphorus, ferrophosphorus, slag, others)
 - d. Discharges to atmosphere
 - e. Discharges to wastewater
 - f. Solid wastes, including pond residues and treatment plant residues

6. Are waste waters from sources other than elemental phosphorus production discharged to the pond system? _____ If so, identify sources and volumes.
- _____
- _____
- _____

Do pollutants from these other sources interfere with lime or other treatment processes? _____ If so, identify the pollutants, sources, and problems caused.

7. Do you collect plant site storm runoff? _____ If you do, provide details on collection, treatment and ultimate disposal of runoff. Indicate storm water collection areas on a site diagram.
- _____
- _____

8. Provide current analysis of pond water in terminal pond(s) of containment or treatment system(s).
- _____

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

9. If wastewater discharge becomes necessary in the future, how will treatment be accomplished?
-

10. Where analyses are requested, please provide available data on total phosphorus as P, acid hydrolyzable phosphate as P, elemental phosphorus, fluoride, cadmium, radium, vanadium, arsenic, TSS, TDS, dissolved silica, DO and pH along with other significant pollutants or pollution parameters.

NA

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

Do N'T produce
AT SITE

PRODUCT: PHOSPHORUS PENTASULFIDE

NA -

1. Has your firm estimated the capital and operating costs for or installed equipment for casting P_2S_5 in an inert atmosphere (carbon dioxide, nitrogen, etc.)? _____ If so, please submit cost and operating data. Operational data should include the purge gas quantities and quantities of P_2S_5 , P_2O_5 , and SO_2 contained in effluent gas (in lb. per 1000 lb. of P_2S_5 production). Provide similar information for equipment to remove these (air) pollutants from the effluent inert gas.

2. Does your plant solidify P_2S_5 by a method other than casting? _____ If so, provide information analogous to above.

3. Has your firm estimated the capital and operating costs for or installed equipment for treatment and recycle of scrubber liquors containing phosphorus and sulfur compounds? _____ If yes, please submit this information along with operating parameters.

4. Do you dispose of any residues that contain or may contain elemental phosphorus? _____ Describe where and how. Estimate the quantity (in lb/1000 lb of product) of elemental phosphorus disposed of in this manner.

5. Do you control elemental phosphorus in your waste water? _____ If so, how? _____

6. Do you return all phosphy transport water to the phosphorus supplier? _____ If not, how is this phosphy water handled?

INDUSTRIAL COMPANY
PENNSYLVANIA AGENCIES
KENILWORTH, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

7. Describe methods of disposal for aborted batches and spills. Is incineration used? _____ If so, describe how sulfur dioxide and phosphorus pentoxide fumes are controlled.

8. Describe disposal methods for reactor water seal phosphorus/sulfide muds.

9. Do you use returnable containers for your product? _____ Describe how wastes in returned containers are handled and disposed of.

10. Describe disposal methods for waters used to clean out process and storage vessels.

11. Identify the quantities, sources, and nature of noncondensable gases present in effluent gases leaving processing equipment, casting hoods, other equipment enclosures, and scrubbers. List individually. Identify other process vents that may contain P₂S₅ or other pollutants.

12. Provide available data on the arsenic content of your raw waste water, treated waste water, product, still residues, the elemental phosphorus raw material, and other fractions. Describe present or planned methods to control the arsenic level in your waste water. Have you conducted feasibility studies of arsenic removal or treatment? _____ If yes, provide details.

Corporation _____
Plant _____
City _____ State _____

- NA

INDUSTRIAL SOLVENTS
PHOSPHORUS TRICHLORIDE
KENTON, N.J. 07032

Corporation _____
Plant _____
City _____ State _____

PRODUCT: PHOSPHORUS TRICHLORIDE

NA

1. Has your firm studied the feasibility of refrigerated condensers (in lieu of or in addition to product condensers) for the purpose of reducing pollutants in vent gases? _____ Please submit this information and operating parameters. Include quantities of noncondensable gases, PCl_3 , and other pollutants in the effluent gas (in lb. per 1000 lb. of PCl_3 production). Provide similar information on equipment used or evaluated to remove these pollutants from the vented gas stream.

2. Identify the quantities, sources, and nature of noncondensable gases present in the effluent gases leaving the holding tank and container-filling operations. Identify other process vents that may contain PCl_3 or other pollutants.

3. Do you dispose of any residues that contain or may contain elemental phosphorus? _____ If so, describe where and how. Estimate the quantity of elemental phosphorus (in lb/1000 lb of product) disposed of in this manner.

4. Describe disposal methods for aborted batches and spills.

5. Do you use isolated sump systems in all areas where elemental phosphorus is handled or processed? _____ Describe the handling and ultimate fate of elemental phosphorus spills.

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Corporation _____
Plant _____
City _____ State _____

6. Do you control the elemental phosphorus in your waste water? _____ If so, how?

7. Do you return all phosphy transport water to the phosphorus supplier? _____ If not, describe how phosphy water is handled.

8. Do you use returnable containers for your product? _____ Describe how wastes in returned containers are handled and disposed of.

9. Describe disposal methods for waters used to clean out process and storage vessels.

10. Provide available data on the arsenic content of your raw waste water, treated waste water, product, still residues, the elemental phosphorus raw material, and other fractions. Describe present or planned methods to control the arsenic level in your waste water.

Have you conducted feasibility studies of arsenic removal or treatment? _____ If yes, provide details.

11. Where analyses are requested, please provide available data on total phosphorus as P, acid hydrolyzable phosphate as P, elemental phosphorus, arsenic, chloride, pH, free chlorine as well as other significant pollutants or pollution parameters.

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KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

PRODUCT: PHOSPHORUS OXYCHLORIDE

1. Has your firm studied the feasibility of refrigerated condensers (in lieu of or in addition to product condensers) for the purpose of reducing pollutants in vent gases? Please submit this information and operating parameters. Include quantities of noncondensable gases, POCl_3 , and other pollutants in the effluent gas (in lb. per 1000 lb. of POCl_3 production). Provide similar information on equipment used or evaluated to remove these pollutants from the vented gas stream.

2. Identify the quantities, sources, and nature of noncondensable gases present in the effluent gases leaving the holding tank and container-filling operations. Identify other process vents that may contain POCl_3 or other pollutants.

3. Describe disposal methods for aborted batches and spills.

4. Do you use returnable containers for your product? _____ Describe how wastes in returned containers are handled and disposed of.

5. Describe disposal methods for waters used to clean out process and storage vessels.

6. Do you dispose of filter elements used in your process? _____ If so, describe disposal methods. Identify the major pollutants contained in filter elements. Give estimate of quantities.

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PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

7. Provide available data on the arsenic content of your raw waste water, treated waste water, raw materials, product, still residues and other fractions. Describe present or planned methods to control the arsenic level of your waste water. Have you conducted feasibility studies of arsenic removal or treatment? _____ If yes, provide details.

8. Where analyses are requested, please provide available data on total phosphorus as P, acid hydrolyzable phosphorus as P, elemental phosphorus, arsenic, chloride, pH, and free chlorine as well as other significant pollutants or pollution parameters.

MONSANTO COMPANY
PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

PRODUCT: SODIUM TRIGLYPHOSPHATE AND CALCIUM PHOSPHATES

1. Indicate type of dry dust collection equipment (e.g., cyclones only, electrostatic precipitators, bag-type filters, etc.) used for each vented stream, including reduction efficiencies achieved, if known. Indicate whether wet collectors such as scrubbers and wet electrostatic precipitators are also used. Indicate type (e.g., high energy, packed, cross flow, etc.).

Wet Cyclones & Scrubbers

Bag Type Collectors

2. Estimate the quantities (in lb. per 1000 lb. of production) of phosphates that escape to the atmosphere in the form of dusts and mists. Indicate chemical identity and sources (e.g., dust collector vents, scrubber vents, product filling operations, etc.). Indicate the percentage of these airborne emissions that become local accumulations (dust on plant exteriors, etc.) which may ultimately become pollutants in stormwater runoff.

1.5 lbs / thousands - 90%

REPORTS BACK AS LOCAL ACCUMULATIONS

3. Estimate the quantities (lb. per 1000 lb. of production) of food-grade calcium phosphates spilled or otherwise accidentally contaminated that cannot be returned to the process because of product purity requirements.

- NA -

Do you operate nonfood-grade processes that can use these spills as products, in-process intermediates, or raw materials? Yes If unusable in other processes, how are spills ultimately disposed of?

Estimate quantities disposed of in these ways.

✓ ✓ -

4. Do you use vacuum cleaning equipment to collect dry spills and dust indoors? No If not, is the installation of such equipment anticipated? No

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PENNSYLVANIA AVENUE
KEARNY, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

5. Identify the quantities (lb. per 1000 lb. of production) and types of impurities present in your waste waters that would prevent their reuse in food-grade phosphate processes. Identify the sources of these impurities (e.g., well water, process water, phosphoric acid, lime, sodium hydroxide, soda ash, corrosion products, etc.).

No identified or analyzed. Products are not

food grade.

6. If you produce nonfood-grade sodium phosphates, do you achieve complete recycle of process waste waters from any of your manufacturing processes? Yes If yes, please provide recent available analyses of your products, as follows:

| <u>Analysis</u> | <u>Average</u> | <u>S.D.</u> |
|------------------------|-----------------|---------------|
| Loss on drying % | <u><0.8</u> | <u> </u> |
| Loss on Ignition% | <u><1.3</u> | <u> </u> |
| Arsenic | <u> </u> | <u> </u> |
| Fluoride | <u> </u> | <u> </u> |
| Heavy metals (as Pb) | <u> </u> | <u> </u> |
| Insoluble substances % | <u><0.10</u> | <u> </u> |
| Lead | <u> </u> | <u> </u> |
| Chlorides | <u> </u> | <u> </u> |
| Sulfites | <u> </u> | <u> </u> |
| Sulfates | <u> </u> | <u> </u> |
| Nitrates | <u> </u> | <u> </u> |
| Mercury | <u> </u> | <u> </u> |

7. If you produce nonfood-grade calcium phosphates, do you achieve complete recycle of process waste waters from any of your manufacturing processes? If yes, please provide recent available analyses of your products, as follows:

| <u>Analysis</u> | <u>Average</u> | <u>S.D.</u> |
|----------------------|----------------|---------------|
| Loss on drying | <u> </u> | <u> </u> |
| Loss on Ignition | <u> </u> | <u> </u> |
| Arsenic | <u> </u> | <u> </u> |
| Fluoride | <u> </u> | <u> </u> |
| Heavy metals (as Pb) | <u> </u> | <u> </u> |
| Insoluble substances | <u> </u> | <u> </u> |
| Lead | <u> </u> | <u> </u> |
| Chlorides | <u> </u> | <u> </u> |
| Sulfites | <u> </u> | <u> </u> |
| Sulfates | <u> </u> | <u> </u> |
| Nitrates | <u> </u> | <u> </u> |
| Mercury | <u> </u> | <u> </u> |

8. If you produce food-grade calcium or sodium phosphates, have you ever evaluated the applicability of complete

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Pennsylvania Avenue
Kearny, N. J. 07032

Corporation _____
Plant _____
City _____ State _____

recycle? NA If so, please submit economic evaluations
and process parameters.

_____ NA _____

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U.S. DEPARTMENT OF LABOR

Form No. LSH-005-4
May 1969

WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

October, 1971

SECTION I

| | | | |
|--|------------------|-------------------------|----------------|
| MANUFACTURER'S NAME | Monsanto Company | EMERGENCY TELEPHONE NO. | (314) 694-1000 |
| ADDRESS (Number, Street, City, State, and ZIP Code) | | | |
| 800 North Lindbergh Blvd., St. Louis, Missouri 63166 | | | |
| CHEMICAL NAME AND SYNONYMS | | TRADE NAME AND SYNONYMS | |
| Orthophosphoric Acid | | Phosphoric Acid | |
| CHEMICAL FAMILY | FORMULA | | |
| Phosphorus | H_3PO_4 | | |

SECTION II HAZARDOUS INGREDIENTS

| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % | TL (Units) |
|-----------------------------------|---|-------------|--|---|------------|
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Not a hazardous material as defined in 29 CFR Section 1501.2 which pertains to this data sheet.

SECTION III PHYSICAL DATA

| | | | |
|-------------------------------|-------------------------------|------------------------------------|-----|
| BOILING POINT (°F.) | Aprox. 500°F | SPECIFIC GRAVITY ($H_2O=1$) @25° | 1.6 |
| VAPOR PRESSURE (mm Hg.) @20°C | 0.0285 | PERCENT VOLATILE BY VOLUME (%) | NA |
| VAPOR DENSITY (AIR=1) | | EVAPORATION RATE (_____=1) | NA |
| SOLUBILITY IN WATER | Complete | | |
| APPEARANCE AND ODOR | Water white liquid - No odor. | | |

SECTION IV FIRE AND EXPLOSION HAZARD DATA

| | | | | | |
|---|----|------------------|----|-----|-----|
| FLASH POINT (Method used) | NA | FLAMMABLE LIMITS | NA | Lel | Uel |
| EXTINGUISHING MEDIA | NA | | | | |
| SPECIAL FIRE FIGHTING PROCEDURES | NA | | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | | | | | |
| Phosphoric Acid is not flammable, but it can react with metals to liberate hydrogen, a flammable gas. | | | | | |

* Values given are for the 100% Acid.

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON

00003506

| | |
|------------------------------------|--|
| THRESHOLD LIMIT VALUE | 1 mg/M ³ |
| EFFECTS OF OVEREXPOSURE | is a corrosive acid which may cause burns on contact with any part of the body. It may cause local damage if taken internally in concentrated doses. |
| EMERGENCY AND FIRST AID PROCEDURES | In case of contact flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. |

| SECTION VI REACTIVITY DATA | | | |
|--------------------------------------|----------------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |
| INCOMPATIBILITY (Materials to avoid) | | | |
| HAZARDOUS DECOMPOSITION PRODUCTS | | | |
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

| SECTION VII SPILL OR LEAK PROCEDURES | |
|---|---|
| STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED | Flush with water or neutralize with a base such as soda ash (sodium carbonate). |
| WASTE DISPOSAL METHOD | Flush with water - Landfill neutralized material. |

| SECTION VIII SPECIAL PROTECTION INFORMATION | | | |
|---|----------------------|----------------|--|
| RESPIRATORY PROTECTION (Specify type) If exposed to phosphoric acid vapors, use B of M-all purpose cannister & mask. | | | |
| VENTILATION | LOCAL EXHAUST | SPECIAL | |
| | MECHANICAL (General) | OTHER | |
| PROTECTIVE GLOVES | | EYE PROTECTION | |
| Good practice | | Safety goggles | |
| OTHER PROTECTIVE EQUIPMENT Clothing of rubber or other impervious material may be used to protect the body against phosphoric acid splashes. | | | |

| SECTION IX SPECIAL PRECAUTIONS | |
|---|--|
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Store in rubber lined or stainless steel tanks designed for H ₃ PO ₄ . Store drums away from heat and out of direct sunlight. | |
| OTHER PRECAUTIONS Consult Manufacturing Chemists' Assn. Chemical Safety Data Sheet SD-70 for full particulars on safety for phosphoric acid. | |

Form Approved OMB
No. 44-R1387
Approval Expires:
July 30, 1972

U.S. DEPARTMENT OF LABOR

Form No. OSHA-20
May, 1971

MATERIAL SAFETY DATA SHEET

| SECTION I | |
|--|---|
| MANUFACTURER'S NAME MONSANTO COMPANY | EMERGENCY TELEPHONE NO. (314) 694-1000 |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Boulevard, St. Louis, Missouri 63166 | |
| CHEMICAL NAME AND SYNONYMS Phthalic Anhydride | TRADE NAME AND SYNONYMS |
| CHEMICAL FAMILY Aromatic Acid Anhydride | FORMULA C₈H₄O₃ |

| SECTION II HAZARDOUS INGREDIENTS | | | | |
|---|---|-------------|--|---------------|
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % |
| PIGMENTS | | | BASE METAL | |
| CATALYST | | | ALLOYS | |
| VEHICLE | | | METALLIC COATINGS | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | |
| ADDITIVES | | | OTHERS | |
| OTHERS | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % TLV (Units) |
| | | | | |
| | | | | |
| | | | | |

| SECTION III PHYSICAL DATA | | | |
|---------------------------|---------------------------|----------------------|---------------------------------------|
| BOILING POINT (mm Hg.) | 760 mm. sublimates | 284°C | SPECIFIC GRAVITY (H ₂ O=1) |
| VAPOR PRESSURE (mm Hg.) | 96.5°C | 1 mm. | PERCENT VOLATILE BY VOLUME (%) |
| VAPOR DENSITY (AIR=1) | | 5.10 | EVAPORATION RATE (AIR=1) |
| SOLUBILITY IN WATER | at 25°C slight | 0.6 g/100 ml. | |

| | |
|--|--|
| APPEARANCE AND ODOR | White fused mass or flakes - characteristic choking odor. |
| Also handled in molten form (M.P. 131°C) | |

| SECTION IV FIRE AND EXPLOSION HAZARD DATA | | | |
|---|---|------------------|--------------|
| FLASH POINT (Method used) | CC 304°F | FLAMMABLE LIMITS | |
| EXTINGUISHING MEDIA | Dry powder, CO₂, chemical foam, water fog | LeI | UeI |
| SPECIAL FIRE FIGHTING PROCEDURES | | 1-7% | 10-4% |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | | | |

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U.S. DEPARTMENT OF LABOR

Form No. LSH-005-4
May 1969

WAGE AND LABOR STANDARDS ADMINISTRATION Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

December 1971

| SECTION I | |
|--|--|
| MANUFACTURER'S NAME Monsanto Company | EMERGENCY TELEPHONE NO. (314) 694-1000 |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Blvd., St. Louis, Missouri 63166 | |
| CHEMICAL NAME AND SYNONYMS Ammonium Polyphosphate | TRADE NAME AND SYNONYMS Phos-Chek P/30 |
| CHEMICAL FAMILY Ammonium Phosphate | FORMULA NH₄(PO₃)_x |

| SECTION II. HAZARDOUS INGREDIENTS | | | | | |
|---|---|-------------|--|---|---------------|
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % | TLV (Units) |
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | | % TLV (Units) |
| Not a hazardous material as defined in 29 CFR, Section 1501.2, which pertains to this data sheet. | | | | | |
| | | | | | |
| | | | | | |

| SECTION III. PHYSICAL DATA | | | |
|----------------------------|----------------------|---------------------------------------|----|
| BOILING POINT (°F.) | NA | SPECIFIC GRAVITY (H ₂ O=1) | NA |
| VAPOR PRESSURE (mm Hg.) | NA | PERCENT VOLATILE BY VOLUME (%) | NA |
| VAPOR DENSITY (AIR=1) | NA | EVAPORATION RATE (=1) | NA |
| SOLUBILITY IN WATER | Insoluble | | |
| APPEARANCE AND ODOR | A fine, white powder | | |

| SECTION IV. FIRE AND EXPLOSION HAZARD DATA | | | |
|--|----|------------------|----|
| FLASH POINT (Method used) | NA | FLAMMABLE LIMITS | NA |
| EXTINGUISHING MEDIA | NA | | |
| SPECIAL FIRE FIGHTING PROCEDURES | NA | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | NA | | |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE

THRESHOLD LIMIT VALUE None established

EFFECTS OF OVEREXPOSURE None

EMERGENCY AND FIRST AID PROCEDURES None

SECTION VI REACTIVITY DATA

| | | | |
|-----------|----------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

| | | | |
|-----------------------------|----------------|---|---------------------|
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Normal good housekeeping procedures

WASTE DISPOSAL METHOD Landfill

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

| | | |
|-------------|---------------------------------------|---------|
| VENTILATION | LOCAL EXHAUST If dust is a problem | SPECIAL |
| | MECHANICAL (General) | OTHER |

PROTECTIVE GLOVES EYE PROTECTION Good practice

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

None

OTHER PRECAUTIONS

Form Approved OMB
No. 44-R1387
Approval Expires:
July 30, 1972

U.S. DEPARTMENT OF LABOR

Form No. OSHA-20
May, 1971

MATERIAL SAFETY DATA SHEET

| SECTION I | | | | |
|--|-------------------|-------------------|--|--------------|
| MANUFACTURER'S NAME MONSANTO COMPANY | | | EMERGENCY TELEPHONE NO. (314) 694-1000 | |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Boulevard, St. Louis, Missouri 63166 | | | | |
| CHEMICAL NAME AND SYNONYMS | | | TRADE NAME AND SYNONYMS Santicizer 261 | |
| CHEMICAL FAMILY Phthalate Ester | | | FORMULA | |
| SECTION II HAZARDOUS INGREDIENTS | | | | |
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % (I) |
| PIGMENTS | | | BASE METAL | |
| CATALYST | | | ALLOYS | |
| VEHICLE | | | METALLIC COATINGS | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | |
| ADDITIVES | | | OTHERS | |
| OTHERS | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % (I) |
| Not hazardous by definitions in 29 CFR Section 1501.2 which pertains to this data sheet. | | | | |
| | | | | |
| | | | | |
| SECTION III PHYSICAL DATA | | | | |
| BOILING POINT | 760 mm | 390°C | SPECIFIC GRAVITY (H ₂ O=1) 25/25°C | 1.073 |
| VAPOR PRESSURE (mm Hg.) | 200°C | 1.0 | PERCENT VOLATILE BY VOLUME (%) | N.A. |
| VAPOR DENSITY (AIR=1) | | N.A. | EVAPORATION RATE (BuAc = 1) | <1 |
| SOLUBILITY IN WATER 25°C negligible | | <0.001% | | |
| APPEARANCE AND ODOR Clear, oily liquid. Slight, characteristic odor. | | | | |
| SECTION IV FIRE AND EXPLOSION HAZARD DATA | | | | |
| FLASH POINT (Method used) | COC 445° F | | FLAMMABLE LIMITS | Let Uel |
| | | | N.A. | |
| EXTINGUISHING MEDIA Dry powder, CO₂, chemical foam, water fog. | | | | |
| SPECIAL FIRE FIGHTING PROCEDURES | | | | |
| | | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | | | | |
| | | | | |

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Santicizer 261 SECTION V HEALTH HAZARD DATA

| |
|--|
| THRESHOLD LIMIT VALUE |
| EFFECTS OF OVEREXPOSURE |
| Impossible at ambient temperature. Excessive high temperature. |
| May produce irritating vapors. |
| EMERGENCY AND FIRST AID PROCEDURES |
| Unlikely to be necessary. Remove to fresh air. |
| |
| |

SECTION VI REACTIVITY DATA

| | | | |
|--------------------------------------|----------------------------------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |
| INCOMPATIBILITY (Materials to avoid) | None | | |
| HAZARDOUS DECOMPOSITION PRODUCTS | Smoke, soot, CO, CO ₂ | | |
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

SECTION VII SPILL OR LEAK PROCEDURES

| |
|---|
| STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED |
| Clean up like other non-hazardous materials. |
| |
| |
| WASTE DISPOSAL METHOD |
| Same as motor oil. |
| |
| |

SECTION VIII SPECIAL PROTECTION INFORMATION

| | | |
|---------------------------------------|--|------------------------------|
| RESPIRATORY PROTECTION (Specify type) | Not necessary | |
| VENTILATION | LOCAL EXHAUST if excessively high temp. | SPECIAL |
| | MECHANICAL (General) Not necessary | OTHER |
| PROTECTIVE GLOVES | Not necessary but good indust. | EYE PROTECTION |
| | practice. | Not necessary except as good |
| OTHER PROTECTIVE EQUIPMENT | None | industrial practice |

SECTION IX SPECIAL PRECAUTIONS

| |
|---|
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING |
| Although no special precautions appear necessary, good industrial practice as to housekeeping and personal hygiene. |
| OTHER PRECAUTIONS |
| Avoidance of prolonged and repeated skin contact and splashing in eyes is indicated. |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

JPR:HOH:WBP:EPW

April 7, 1972

U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

| | | |
|--|--|--|
| MANUFACTURER'S NAME Monsanto Company | | EMERGENCY TELEPHONE NO. Texas City, 713-945-4431 |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Boulevard, St. Louis, Missouri 63166 | | |
| CHEMICAL NAME AND SYNONYMS Toluene, Methyl Benzene | | TRADE NAME AND SYNONYMS Toluene, Toluol |
| CHEMICAL FAMILY Aromatic Hydrocarbon | FORMULA C₆H₅CH₃ | |

SECTION II HAZARDOUS INGREDIENTS

| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % | TLV (Units) |
|---|---|-------------|---|---|-------------|
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % | TLV (Units) |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

SECTION III PHYSICAL DATA

| | | | |
|---|--------|---|------|
| BOILING POINT (°F.) | 231 | SPECIFIC GRAVITY (H ₂ O = 1) | .866 |
| VAPOR PRESSURE (mm Hg.) 77°F (25°C) | 28 | PERCENT VOLATILE BY VOLUME (%) | 100 |
| VAPOR DENSITY (AIR = 1) | 3.1 | EVAPORATION RATE (Ether = 1) | <1 |
| SOLUBILITY IN WATER | <0.03% | | |
| APPEARANCE AND ODOR Colorless Liquid with Aromatic, Benzene-like Odor. | | | |

SECTION IV FIRE AND EXPLOSION HAZARD DATA

| | | | |
|---|----------------------------|-------------------|-------------------|
| FLASH POINT (Method used) Tag Closed Cup 40°F (4.4°C) | FLAMMABLE LIMITS Vol. % | LEL 1.3 | UEL 7.0 |
| EXTINGUISHING MEDIA CO₂, Dry Chemical and Foam | | | |
| SPECIAL FIRE FIGHTING PROCEDURES Water spray can be used to control unconfined toluene fires but usually will not extinguish. In open tank fires, solid hose streams tend to scatter toluene and spread fire. | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS Class II flammable liquid which when diffused in air can form explosive mixtures and are heavier than air. Fires and explosions can be easily caused by static electricity. | | | |

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| SECTION V HEALTH HAZARD DATA | |
|------------------------------------|---|
| THRESHOLD LIMIT VALUE | 100 ppm |
| EFFECTS OF OVEREXPOSURE | Headache, nausea, giddiness, and loss of consciousness in sequence. Acute toxic symptoms can result from inhalation of vapor. In extreme case, can cause death by respiratory paralysis. |
| EMERGENCY AND FIRST AID PROCEDURES | Ingestion - call physician immediately. Induce vomiting with warm salt water or soapy water or have patient stick finger down throat, if necessary. Keep warm. Inhalation - restore consciousness, if necessary, and call physician at once. Keep warm. If trained person available, administer oxygen. |

| SECTION VI REACTIVITY DATA | | | |
|--|----------------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |
| INCOMPATIBILITY (Materials to avoid) Acids or oxidizing materials. | | | |
| HAZARDOUS DECOMPOSITION PRODUCTS Toxic fumes on heating. | | | |
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

| SECTION VII SPILL OR LEAK PROCEDURES | |
|--|--|
| STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Only protected personnel should remain in area. Spills should be flushed promptly with water to waste disposal facilities. Large amounts should not be allowed to enter drains or sewers where ignition can occur. | |
| WASTE DISPOSAL METHOD All quantities of toluene should be burned in accordance with Federal, State and local health and pollution regulations. Provision must be made to prevent toluene spills from entering public sewers or drains in sufficient amounts to cause explosion hazards. | |

| SECTION VIII SPECIAL PROTECTION INFORMATION | | |
|---|--|---|
| RESPIRATORY PROTECTION (Specify type) Bureau of Mines approved canister gas masks up to 2% for short time. Air or O ₂ supplied full face masks above 2%. | | |
| VENTILATION | LOCAL EXHAUST Needed when handled at elev. temp. and/or in open. | SPECIAL |
| | MECHANICAL (General) General ventilation normally sufficient. | OTHER |
| PROTECTIVE GLOVES | Rubber or Insoluble Plastic | EYE PROTECTION Chemical safety goggles if eye contact possible. |
| OTHER PROTECTIVE EQUIPMENT Clothing of rubber or other impervious material will protect body against toluene splashes. | | |

| SECTION IX SPECIAL PRECAUTIONS | |
|--|--|
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Non-sparking tools; no smoking allowed; eliminate all static sources by proper grounding of all equipment, tanks, drums, etc. Never use air pressure for toluene transfer. | |
| OTHER PRECAUTIONS Hazards of loading and unloading toluene and of cleaning and repair of tanks and equipment should be thoroughly understood. | |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

U.S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

October 1971

| SECTION I | |
|--|--|
| MANUFACTURER'S NAME Monsanto Company | EMERGENCY TELEPHONE NO. (314) 694-1000 |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Blvd., St. Louis, Missouri 63166 | |
| CHEMICAL NAME AND SYNONYMS Carbon | TRADE NAME AND SYNONYMS Lampblack |
| CHEMICAL FAMILY Carbon | FORMULA C |

| SECTION II. HAZARDOUS INGREDIENTS | | | | |
|--|---|-------------|--|---------------|
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % TL (Units) |
| PIGMENTS | | | BASE METAL | |
| CATALYST | | | ALLOYS | |
| VEHICLE | | | METALLIC COATINGS | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | |
| ADDITIVES | | | OTHERS | |
| OTHERS | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % TLV (Units) |
| Not a hazardous material as defined in 29 CFR, Section 1501.2 which pertains to this data sheet. | | | | |
| | | | | |
| | | | | |

| SECTION III. PHYSICAL DATA | | | |
|----------------------------|------------------------------------|---------------------------------------|----|
| BOILING POINT (°F.) | NA | SPECIFIC GRAVITY (H ₂ O=1) | NA |
| VAPOR PRESSURE (mm Hg.) | NA | PERCENT VOLATILE BY VOLUME (%) | NA |
| VAPOR DENSITY (AIR=1) | NA | EVAPORATION RATE (1 = 1) | NA |
| SOLUBILITY IN WATER | Negligible | | |
| APPEARANCE AND ODOR | Fine black to gray powder, no odor | | |

| SECTION IV. FIRE AND EXPLOSION HAZARD DATA | | | |
|--|----|------------------|-----|
| FLASH POINT (Method used) | NA | FLAMMABLE LIMITS | NA |
| EXTINGUISHING MEDIA | NA | Let | Uel |
| SPECIAL FIRE FIGHTING PROCEDURES | NA | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | NA | | |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

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THRESHOLD LIMIT VALUE 3.5 mg/M3 of air

EFFECTS OF OVEREXPOSURE NA

EMERGENCY AND FIRST AID PROCEDURES NA

SECTION VI REACTIVITY DATA

| | | | |
|-----------|----------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

| | | | |
|-----------------------------|----------------|---|---------------------|
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Normal good housekeeping procedures

WASTE DISPOSAL METHOD

Landfill

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
Dust (B or M) - If not controlled by ventilation

| | | |
|-------------|--|---------|
| VENTILATION | LOCAL EXHAUST Where dust is a problem | SPECIAL |
| | MECHANICAL (General) | OTHER |

| | | | |
|-------------------|----|----------------|---------------|
| PROTECTIVE GLOVES | NA | EYE PROTECTION | Good practice |
|-------------------|----|----------------|---------------|

| | |
|----------------------------|----|
| OTHER PROTECTIVE EQUIPMENT | NA |
|----------------------------|----|

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
If dust is a problem, use of respiratory protection is recommended.

| | |
|-------------------|------|
| OTHER PRECAUTIONS | None |
|-------------------|------|

U.S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

December 1971

| SECTION I | |
|--|--|
| MANUFACTURER'S NAME Monsanto Company | EMERGENCY TELEPHONE NO. (314) 694-1000 |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Blvd., St. Louis, Missouri 63166 | |
| CHEMICAL NAME AND SYNONYMS Bone Ash | TRADE NAME AND SYNONYMS Bone Ash |
| CHEMICAL FAMILY Calcium Phosphate | FORMULA Approx. $\text{Ca OH}(\text{PO}_3)_2$ |

| SECTION II. HAZARDOUS INGREDIENTS | | | | | |
|---|---|-------------|--|---|-------------|
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % | TLV (Units) |
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % | TLV (Units) |
| Not a hazardous material as defined in 29 CFR Section 1501.2 which pertains to this data sheet. | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| SECTION III. PHYSICAL DATA | | | |
|----------------------------|-------------------------------|---|----|
| BOILING POINT (°F.) | NA | SPECIFIC GRAVITY ($\text{H}_2\text{O}=1$) | NA |
| VAPOR PRESSURE (mm Hg.) | NA | PERCENT VOLATILE BY VOLUME (%) | NA |
| VAPOR DENSITY (AIR=1) | NA | EVAPORATION RATE (—=1) | NA |
| SOLUBILITY IN WATER | Insoluble | | |
| APPEARANCE AND ODOR | A fine white powder - no odor | | |

| SECTION IV. FIRE AND EXPLOSION HAZARD DATA | | | |
|--|----|------------------|----|
| FLASH POINT (Method used) | NA | FLAMMABLE LIMITS | NA |
| EXTINGUISHING MEDIA | NA | | |
| SPECIAL FIRE FIGHTING PROCEDURES | NA | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | NA | | |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

THRESHOLD LIMIT VALUE None established

EFFECTS OF OVEREXPOSURE NA

EMERGENCY AND FIRST AID PROCEDURES NA

SECTION VI REACTIVITY DATA

| | | | |
|-----------|----------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

| | | | |
|-----------------------------|----------------|---|---------------------|
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Normal good housekeeping procedures

WASTE DISPOSAL METHOD Landfill

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

| | | |
|-------------|---------------------------------------|---------|
| VENTILATION | LOCAL EXHAUST If dust is a problem | SPECIAL |
| | MECHANICAL (General) | OTHER |

PROTECTIVE GLOVES EYE PROTECTION Good practice

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

None

OTHER PRECAUTIONS None

Form Approved OMB
No. 44-R1387
Approval Expires:
July 30, 1972

U.S. DEPARTMENT OF LABOR

Form No. OSHA-20
May, 1971

Revised 9-23-80
MATERIAL SAFETY DATA SHEET

| SECTION I | | | | |
|--|-----------------|--|---|------------|
| MANUFACTURER'S NAME MONSANTO COMPANY | | EMERGENCY TELEPHONE NO. (314) 694-1000 | | |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Boulevard, St. Louis, Missouri 63166 | | | | |
| CHEMICAL NAME AND SYNONYMS Benzyl Chloride (Alpha Chlorotoluene) | | TRADE NAME AND SYNONYMS | | |
| CHEMICAL FAMILY Chlorinated Aromatic | | FORMULA C₆H₅CH₂Cl | | |
| SECTION II HAZARDOUS INGREDIENTS | | | | |
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % |
| PIGMENTS | | | BASE METAL | |
| CATALYST | | | ALLOYS | |
| VEHICLE | | | METALLIC COATINGS | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | |
| ADDITIVES | | | OTHERS | |
| OTHERS | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| SECTION III PHYSICAL DATA | | | | |
| BOILING POINT (mm. Hg.) | 760 mm. | 179°C | SPECIFIC GRAVITY (H ₂ O=1) 25/25°C | 1.099 |
| VAPOR PRESSURE (mm. Hg.) | 60°C | 10.3 | PERCENT VOLATILE BY VOLUME (%) | 100% |
| VAPOR DENSITY (AIR=1) | | 4.36 | EVAPORATION RATE (BuAc=1) | 51 |
| SOLUBILITY IN WATER | 25°C negligible | 0.003% | | |
| APPEARANCE AND ODOR Clear, colorless liquid with lachrymatory odor. | | | | |
| SECTION IV FIRE AND EXPLOSION HAZARD DATA | | | | |
| FLASH POINT (Method used) | | CC 153°F | FLAMMABLE LIMITS VOL. % | LeI 1.1 |
| EXTINGUISHING MEDIA Dry powder, CO₂, water fog. | | | | |
| SPECIAL FIRE FIGHTING PROCEDURES | | | | |
| | | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS Burning may produce irritating hydrochloric acid vapors. | | | | |

BENZYL CHLORIDE IS A CORROSIVE MATERIAL AS DEFINED IN D.O.T. REGULATIONS.

Benzyl Chloride

SECTION V HEALTH HAZARD DATA

| | |
|---|---------------------|
| THRESHOLD LIMIT VALUE | 5 mg/M ³ |
| EFFECTS OF OVEREXPOSURE Benzyl chloride is an irritant in its liquid or vapor form. On contact with the skin can cause redness and irritation; it can cause eye irritation but no permanent damage. | |
| EMERGENCY AND FIRST AID PROCEDURES 1. For skin contact, quickly wash with soap and water using safety shower if large area. For eye contact, flush with water. For mild inhalation, remove self from area. For severe inhalation with breathing difficulty, use breathing air and/or | |

bronchi
dialato

SECTION VI REACTIVITY DATA

| | | | | |
|--|----------------|---|---------------------|--|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID | Classified stable by NPA |
| | STABLE | X | | |
| INCOMPATIBILITY (Materials to avoid) For uninhibited benzyl chloride, avoid metals other than nickel. | | | | |
| HAZARDOUS DECOMPOSITION PRODUCTS hydrochloric acid vapors, smoke, soot, CO, CO ₂ . | | | | |
| HAZARDOUS POLYMERIZATION | MAY OCCUR | X | CONDITIONS TO AVOID | Contact of uninhibited material with iron or steel. Heat will speed polymerization reaction with iron. |
| | WILL NOT OCCUR | | | |

SECTION VII SPILL OR LEAK PROCEDURES

| | |
|--|--|
| STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Keep people away, keep upwind. Shut off leak if without risk. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. | |
| WASTE DISPOSAL METHOD Dike large spills and remove by pumping into a salvage tank. If removal is impossible, or for small spills, flush area with water spray. | |

SECTION VIII SPECIAL PROTECTION INFORMATION

| | | |
|--|----------------------|----------------|
| RESPIRATORY PROTECTION (Specify type) If less than 2% benzyl chloride and greater than 16% oxygen, organic vapor gas mas. | | |
| VENTILATION | LOCAL EXHAUST | SPECIAL |
| | MECHANICAL (General) | OTHER |
| PROTECTIVE GLOVES | Rubber gloves | EYE PROTECTION |
| OTHER PROTECTIVE EQUIPMENT | | Goggles |

SECTION IX SPECIAL PRECAUTIONS

| | |
|---|--|
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Preferred containers for uninhibited benzyl chloride are made of nickel. | |
| OTHER PRECAUTIONS Avoid polymerization by maintaining iron and iron salt-free material | |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

JPR:HOH:EPW:WBP

3/15/72

Form Approved OMB
No. 44-R1387
Approval Expires:
July 30, 1972

U.S. DEPARTMENT OF LABOR

Form No. OSHA-20
May, 1971

MATERIAL SAFETY DATA SHEET

| SECTION I | |
|--|---|
| MANUFACTURER'S NAME MONSANTO COMPANY | EMERGENCY TELEPHONE NO. (314) 694-1000 |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Boulevard, St. Louis, Missouri 63166 | |
| CHEMICAL NAME AND SYNONYMS Butyl Benzyl Phthalate | TRADE NAME AND SYNONYMS Santicizer 160 |
| CHEMICAL FAMILY Phthalate Ester | FORMULA C₁₉H₂₀O₄ |

| SECTION II HAZARDOUS INGREDIENTS | | | | | |
|--|---|-------------|--|---|-------------|
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % | TLV (Units) |
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % | TLV (Units) |
| Not hazardous by definitions in 29 CFR section 1501.2 which pertains to this data sheet. | | | | | |
| | | | | | |
| | | | | | |

| SECTION III PHYSICAL DATA | | | | |
|---|-----------------|----------|---|-------|
| BOILING POINT (mm. Hg.) | 760 mm. | 370°C | SPECIFIC GRAVITY (H ₂ O=1) 25/25°C | 1.119 |
| VAPOR PRESSURE (mm. Hg.) | 150°C | 0.16 mm. | PERCENT VOLATILE BY VOLUME (%) | N.A. |
| VAPOR DENSITY (AIR=1) | | 10.8 | EVAPORATION RATE (BUC =1) | <1 |
| SOLUBILITY IN WATER | 30°C Negligible | 0.0003% | | |
| APPEARANCE AND ODOR Clear, oily liquid. Slight characteristic odor. | | | | |

| SECTION IV FIRE AND EXPLOSION HAZARD DATA | | | | | |
|---|-----|-------|------------------|-----|-----|
| FLASH POINT (Method used) | COC | 390°F | FLAMMABLE LIMITS | Let | Uet |
| | | | N.A. | | |
| EXTINGUISHING MEDIA Dry powder, CO ₂ , chemical foam, water fog. | | | | | |
| SPECIAL FIRE FIGHTING PROCEDURES | | | | | |
| | | | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | | | | | |
| | | | | | |

00000580

Butyl Benzyl Phthalate SECTION V HEALTH HAZARD DATA

| | |
|------------------------------------|--|
| THRESHOLD LIMIT VALUE | Not established |
| EFFECTS OF OVEREXPOSURE | Impossible at ambient temperature. Excessive high temperature may produce irritating vapors. |
| EMERGENCY AND FIRST AID PROCEDURES | Unlikely to be necessary. Remove to fresh air. |

SECTION VI REACTIVITY DATA

| | | | |
|--------------------------------------|----------------------------------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |
| INCOMPATIBILITY (Materials to avoid) | None | | |
| HAZARDOUS DECOMPOSITION PRODUCTS | Smoke, soot, CO, CO ₂ | | |
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

SECTION VII SPILL OR LEAK PROCEDURES

| |
|---|
| STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED |
| Clean up like other non-hazardous liquids. |
| WASTE DISPOSAL METHOD |
| Same as motor oil. |

SECTION VIII SPECIAL PROTECTION INFORMATION

| | | |
|---------------------------------------|----------------------|---|
| RESPIRATORY PROTECTION (Specify type) | Not necessary. | |
| VENTILATION | LOCAL EXHAUST | If excessively high temp. SPECIAL |
| | MECHANICAL (General) | Not necessary. OTHER |
| PROTECTIVE GLOVES | Not necessary. | EYE PROTECTION |
| OTHER PROTECTIVE EQUIPMENT | None | Not necessary except as good industrial practice. |

SECTION IX SPECIAL PRECAUTIONS

| | |
|---|--|
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING | Although no special precautions appear necessary, good industrial practice as to Housekeeping, personal hygiene, |
| OTHER PRECAUTIONS | avoidance of prolonged and repeated skin contact and splashing in eyes is indicated. |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

Form Approved OMB
No. 44-R1387
Approval Expires:
July 30, 1972

U.S. DEPARTMENT OF LABOR

Form No. OSHA-20
May, 1971

MATERIAL SAFETY DATA SHEET

| SECTION I | | | | | |
|--|--------|---|--|------------------|------|
| MANUFACTURER'S NAME MONSANTO COMPANY | | | EMERGENCY TELEPHONE NO. (314) 694-1000 | | |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Boulevard, St. Louis, Missouri 63166 | | | | | |
| CHEMICAL NAME AND SYNONYMS | | | TRADE NAME AND SYNONYMS Santicizer 278 | | |
| CHEMICAL FAMILY Phthalate Ester | | | FORMULA | | |
| SECTION II HAZARDOUS INGREDIENTS | | | | | |
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % | (L) |
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % | (L) |
| Not hazardous by definitions in 29 CFR section 1501.2 which pertains to this data sheet. | | | | | |
| SECTION III PHYSICAL DATA | | | | | |
| BOILING POINT (760 mmHg) | >300°C | SPECIFIC GRAVITY (H ₂ O=1) | 25/25°C | 1.10 | |
| VAPOR PRESSURE (mm Hg.) | 200°C | 0.2 mm | PERCENT VOLATILE BY VOLUME (%) | N.A. | |
| VAPOR DENSITY (AIR=1) | N.A. | EVAPORATION RATE (BUC =1) | <1 | | |
| SOLUBILITY IN WATER | 30°C | Negligible | | | |
| APPEARANCE AND ODOR Clear liquid oily liquid - practically odorless | | | | | |
| SECTION IV FIRE AND EXPLOSION HAZARD DATA | | | | | |
| FLASH POINT (Method used) | | COG 440°F | | FLAMMABLE LIMITS | N.A. |
| EXTINGUISHING MEDIA | | Dry powder, CO ₂ , chemical foam, water fog. | | Lel | Uel |
| SPECIAL FIRE FIGHTING PROCEDURES | | | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | | | | | |

00004850

Santicizer 278

SECTION V

HEALTH HAZARD DATA

| | |
|------------------------------------|--|
| THRESHOLD LIMIT VALUE | Not established |
| EFFECTS OF OVEREXPOSURE | Impossible at ambient temperature. Excessive high temperature may produce irritating vapors. |
| EMERGENCY AND FIRST AID PROCEDURES | Unlikely to be necessary. Remove to fresh air. |

SECTION VI REACTIVITY DATA

| | | | |
|--------------------------------------|----------------------------------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |
| INCOMPATIBILITY (Materials to avoid) | None | | |
| HAZARDOUS DECOMPOSITION PRODUCTS | Smoke, soot, CO, CO ₂ | | |
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

SECTION VII SPILL OR LEAK PROCEDURES

| |
|---|
| STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED |
| Clean up like other non-hazardous liquids. |
| WASTE DISPOSAL METHOD |
| Same as motor oil. |

SECTION VIII SPECIAL PROTECTION INFORMATION

| | | | |
|---------------------------------------|----------------------|---------------------------|---|
| RESPIRATORY PROTECTION (Specify type) | | | Not necessary. |
| VENTILATION | LOCAL EXHAUST | If excessively high temp. | SPECIAL |
| | MECHANICAL (General) | Not necessary. | OTHER |
| PROTECTIVE GLOVES | Not necessary. | EYE PROTECTION | Not necessary except as good industrial practice. |
| OTHER PROTECTIVE EQUIPMENT | None | | |

SECTION IX SPECIAL PRECAUTIONS

| | |
|---|--|
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING | Although no special precautions appear necessary, good industrial practice as to Housekeeping, personal hygiene, |
| OTHER PRECAUTIONS | avoidance of prolonged and repeated skin contact and splashing in eyes is indicated. |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

HOH:EPW:WBP

3/28/72

Form Approved OMB
No. 44-R1387
Approval Expires:
July 30, 1972

U.S. DEPARTMENT OF LABOR

Form No. OSHA-20
May, 1971

MATERIAL SAFETY DATA SHEET

| SECTION I | | | | | |
|--|----------------|---|--|--|-------------|
| MANUFACTURER'S NAME MONSANTO COMPANY | | | | EMERGENCY TELEPHONE NO. (314) 694-1000 | |
| ADDRESS (Number, Street, City, State, and ZIP Code) 800 North Lindbergh Boulevard, St. Louis, Missouri 63166 | | | | | |
| CHEMICAL NAME AND SYNONYMS Aluminum Chloride Anhydrous | | | | TRADE NAME AND SYNONYMS | |
| CHEMICAL FAMILY aluminum salt | | | | FORMULA AL Cl₃ | |
| SECTION II HAZARDOUS INGREDIENTS | | | | | |
| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % | TLV (Units) |
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |
| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | | | | % | TLV (Units) |
| | | | | | |
| | | | | | |
| | | | | | |
| SECTION III PHYSICAL DATA | | | | | |
| BOILING POINT (mm Hg.) (752mm) | 182.7°C | SPECIFIC GRAVITY (H ₂ O = 1) 25°C/25°C | | 2.4471 | |
| VAPOR PRESSURE (mm Hg.) 100.0°C | 1mm | PERCENT VOLATILE BY VOLUME (%) | | N.A. | |
| VAPOR DENSITY (AIR = 1) | N.A. | EVAPORATION RATE (n-Butyl Ac. = 1) | | <1 | |
| SOLUBILITY IN WATER | Decomp | | | | |
| APPEARANCE AND ODOR Orange to yellow through gray to white. | | | | | |
| SECTION IV FIRE AND EXPLOSION HAZARD DATA | | | | | |
| FLASH POINT (Method used) N.A. | | FLAMMABLE LIMITS | | Lo | Hi |
| EXTINGUISHING MEDIA Not explosive or flammable | | | | | |
| SPECIAL FIRE FIGHTING PROCEDURES None | | | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS None; however a violent reaction will occur if streams of water are directed against large quantities of it liberating HCl gas. | | | | | |

00000217

Aluminum Chloride,
Anhydrous

SECTION V HEALTH HAZARD DATA

| | |
|------------------------------------|---|
| THRESHOLD LIMIT VALUE | N.A. Aluminum chloride as such produces no toxic |
| EFFECTS OF OVEREXPOSURE | vapors. The dust is a skin, eye, nose throat and lung irritant due to the release of HCl when exposed to moisture. |
| EMERGENCY AND FIRST AID PROCEDURES | Body areas that have been in contact with aluminum chloride should be flushed with water without undue delay. Eyes should be flushed immediately and thoroughly with water for a minimum of 15 minutes. |

SECTION VI REACTIVITY DATA

| | | | |
|--------------------------------------|-----------------------|---|---------------------|
| STABILITY | UNSTABLE | | CONDITIONS TO AVOID |
| | STABLE | X | |
| INCOMPATIBILITY (Materials to avoid) | water | | |
| HAZARDOUS DECOMPOSITION PRODUCTS | hydrogen chloride gas | | |
| HAZARDOUS POLYMERIZATION | MAY OCCUR | | CONDITIONS TO AVOID |
| | WILL NOT OCCUR | X | |

SECTION VII SPILL OR LEAK PROCEDURES

| | |
|---|--|
| STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED | As much as possible of the aluminum chloride should be shoveled or scooped up and the remainder should be flooded and washed down with a plentiful supply of water. |
| WASTE DISPOSAL METHOD | Aluminum chloride can be drenched with large quantities of H ₂ O and the resulting solution can be disposed of by severing if Federal state and local regulations permit. |

SECTION VIII SPECIAL PROTECTION INFORMATION

| | | |
|---------------------------------------|--|-------------------------|
| RESPIRATORY PROTECTION (Specify type) | Industrial canister type gas masks suitable for HCl with full face piece | |
| VENTILATION | LOCAL EXHAUST | SPECIAL |
| | MECHANICAL (General) | OTHER |
| PROTECTIVE GLOVES | Rubber gloves | EYE PROTECTION |
| OTHER PROTECTIVE EQUIPMENT | Rubber or leather shoes are recommended | goggles or face shields |

SECTION IX SPECIAL PRECAUTIONS

| | |
|---|---|
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING | If stored for long periods of time it should be placed in a cool dry area protected from rain and direct sunshine. |
| OTHER PRECAUTIONS | Violent reaction will occur if streams of water are directed against large quantities of it liberating hydrogen chloride gas. Avoid skin & eye contact. Avoid inhalation of vapors. |

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

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Pursuant to Section 6.05 of the distribution agreement between Pharmacia (formerly Monsanto) and Solutia, Solutia has adopted the former Monsanto Company's Record Retention policy.

Records

Records Management Manual

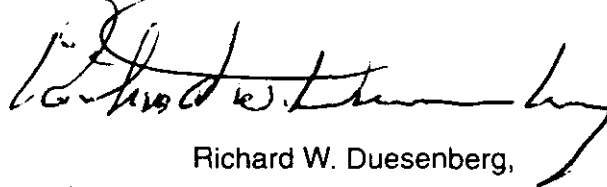
April 1994

Monsanto Company

This manual has been prepared under the direction of the Office of the Corporate Secretary, and supersedes any previously issued Records Management Manual or Schedule.

In the interest of economy and efficiency, records are assigned the shortest practical retention time which satisfies Company needs and legal requirements, and which provides generally uniform retention periods for comparable records throughout the Company.

Requests for assistance in the interpretation of application of this manual should be directed to the Office of the Corporate Secretary.

A handwritten signature in dark ink, appearing to read "Richard W. Duesenberg", with a stylized flourish at the end.

Richard W. Duesenberg,
Senior Vice President,
General Counsel and Secretary

Table Of Contents

| | |
|---|----|
| Introduction | 5 |
| Administrative | 10 |
| Communications | 11 |
| Computers & Data Processing | 14 |
| Contracts & Agreements | 16 |
| Corporate Records | 20 |
| Engineering | 23 |
| Environmental Safety & Health | 27 |
| Financial | 31 |
| Human Resources & Payroll/Benefits | 41 |
| Legal | 47 |
| Manufacturing | 50 |
| Marketing | 53 |
| Patent, Trademark & Copyright | 56 |
| Planning Documents | 58 |
| Purchasing | 59 |
| Real Estate | 60 |
| Risk Management and Insurance | 61 |
| Scientific and Technical | 62 |
| Shipping and Transportation | 64 |
| Tax | 66 |
| Sample Certification of Compliance Letter | 68 |
| Sample Request for Exception Letter | 69 |
| Index | 70 |

Introduction

In a large company like Monsanto, a great many forms, reports, letters and other kinds of documents are produced and received each year. Many of these documents end up in file folders, which end up in file drawers and are never used again. The result is a waste of Company's storage space and a drain on corporate assets.

Monsanto's policy is, once each year, to clear all files of documents that are no longer required to be retained pursuant to this manual.

By June 30 of each year, each Unit Vice President, each U.S. Corporate Staff Department Director and each EMC Member must certify in writing to the Office of the Corporate Secretary that the entire unit has reviewed its files and has kept or discarded all documents in accordance with the retention times in this manual. All managers will be responsible for ensuring that all files, desks, credenzas, computer main frames, hard drives and disks, and any other storage space used by them or their subordinates, are cleared of unnecessary documents; and they must certify to their supervisor that they and their subordinates have complied with this manual.

NOTE: *Electronically stored documents and data are covered by this manual and are to be treated the same way that a corresponding paper document would be handled.*

A sample CERTIFICATION OF COMPLIANCE letter appears on page 68.

Questions Often Asked

1. Who May Receive This Manual?

This manual is available to Monsanto employees who have a need to know its contents. It is not to be given to anyone outside Monsanto without approval from the Office of the Corporate Secretary.

2. Which Parts Of Monsanto Are Covered By This Manual?

This manual covers all U.S. subsidiaries which have not opted to develop their own manual. Ex-U.S. locations may use this manual, but it is geared to U.S. requirements, and Ex-U.S. locations should be aware of local regulations which take precedence. This manual does NOT override local regulations in Ex-U.S. locations.

3. Are Documents Concerning Past Products & Businesses Covered?

Documents that pertain exclusively to divested or discontinued products or businesses should be treated the same as any other documents in Monsanto's possession. The question of which documents to transfer to the purchasers of the business and when to retain copies of transferred documents will be handled on a case-by-case basis.

4. When Do The Retention Times In This Manual Not Apply?

Documents which the Law Department considers relevant to current or pending judicial or agency proceedings or investigations must not be destroyed until after the final resolution of those proceedings and release by the attorney supervising the litigation.

5. What About Indexes To Documents?

Any index entry that refers to a record is considered part of that record. When you destroy a record, be sure to delete any reference to that record that may appear in a retained index.

6. What About Library Materials?

This manual applies to any Company records kept in Company libraries. It does not apply to other library materials such as books, periodicals and reference materials purchased from sources outside the Company.

7. What About Records Stored Off-Site?

Never store work-related records at home. These records are Monsanto property; home storage does not convert them to personal property. Bring any home-stored records to your work site. If the retention period specified for such records in the manual has already ended, dispose of them by using procedures that appropriately safeguard Company confidentiality. If the record retention period for the documents has not passed, see that the documents are properly stored until the end of the period.

Audit any records belonging to your unit that may be in off-site storage the same way you review on-site records.

8. What About Items That Have Historical Value?

Monsanto has an Archives to store historical items, documents, photos, films, etc. Items that have historical value, but would be disposed of according to this manual, may be sent to the Company Archives for retention at the discretion of the Archives personnel and the Corporate Public Relations Department. ["Archives" are listed in the Company's phone book yellow pages.]

Be sure to follow any relevant Monsanto archiving policy developed after this manual is published.

9. What If You Need To Keep A Document Beyond Its Specified Retention Period?

Permission to deviate from the time specified in this manual may be requested from the Office of the Corporate Secretary. The request must come from a Unit Vice President, Corporate Staff Department Director or applicable EMC Member. The request should include: 1) a copy of the record (or a description of it), 2) the reasons for wanting an exception, 3) the retention period requested. A sample REQUEST FOR EXCEPTION letter is on page 69.

10. What If You Can't Find Reference To A Particular Document In The Manual?

If you cannot locate a specific retention time for a document, check with the legal counsel assigned to your department or unit.

Questions Often Asked (Continued)

If a Company or corporate department develops documents for which there is no applicable category in this manual, the Office of the Corporate Secretary should be notified so that appropriate changes can be made when this manual is next revised.

11. What If A Particular Record Is Relevant To More Than One Subject?

If a record pertains to more than one subject and fits under more than one item, use the longest applicable retention time.

12. Is There A Rule Regarding How Long to Keep Drafts Of Documents?

Unless directed otherwise in this manual, discard drafts as soon as they are superseded, which is usually immediately upon preparation of the next draft or upon completion of the final document.

13. Are There Special Rules For Computerized Records? (See Also, Chapter III, Computers & Data Processing)

Unless otherwise specified, if a record is retained in a computerized format but not on paper, the computerized record should be retained for the length of time specified in this manual. If the "official" copy of a document is retained on paper, the computerized version should be retained only as long as needed, and in no event longer than the paper copy.

14. What About Computerized Records?

All documents on a CD, ROM or other disk which cannot be selectively erased or printed out should be retained until the document with the longest retention period must be destroyed.

Documents on main frames and hard drives should be saved annually onto a disk unless you are actively using them. Main frames and hard drives should be erased with special software available from a designated representative in your unit.

Backup documents for hard drives and main frames should be deleted, using the proper procedures, when the documents are to be disposed of according to this manual or when a paper copy of the document is retained.

Documents on electronic or optical disks that are about to become obsolete should be printed out and retained for the remainder of the retention period specified in this manual whenever feasible. If this is not feasible, the obsolete disks should be kept throughout the designated retention period, and a way to convert the documents to a usable format should be designated in case the documents are needed during the remainder of the retention period. After the documents are retained on paper or converted, the obsolete disks should be destroyed or erased by MIS.

Contact MIS for proper disposal of obsolete workstations.

Follow procedures established by your MIS group when deleting computerized documents to comply with this manual.

How To Use This Manual

This manual lists documents by subject category and assigns the length of time the documents should be kept before they are destroyed. Confidential business or trade secret information should always be placed in burn bags.

There are 20 chapters in the manual, listed alphabetically. Each represents a broad topic area, e.g., Human Resources, Real Estate, and Purchasing. However, in the files of every unit there are many different kinds of documents, reports, forms, etc., that are originated outside the unit. It is important, therefore, to become familiar with all chapters of this manual, not just the topic area(s) relating to your primary job responsibilities.

In addition to the chapters listed in the manual's Table of Contents, there is also an Index at the end of this manual. It is an alphabetical list of most of the documents commonly used in Monsanto, with the page number on which the document is discussed.

An example: The filed document in question is a purchase order. First look up "Purchase Order" in the Index. The Index tells you to turn to the Purchasing chapter, page 59.

There you find:

Retention Time

1. Purchase Orders — Including essential related papers

- Originating purchasing office file copy

Until 1 year after termination of contract

This says that the purchasing office that generated the order may keep the document on file for one year **after** the contract has been terminated.

It is obviously impossible to list all documents that are used in Monsanto. Therefore, it is necessary for those who clear the files to make judgments about many documents regarding which category in this manual fits them best.

Terms Used in This Manual:

Record — All written or printed papers, maps and drawings, books, photographs and microphotographs, film and microfilm, electronic and optical disks and tape recordings, slides, transparencies and programs, as well as E-Mail such as cc:Mail, All-in-One, DEC, HP Desk and all electronic data systems and records of any type; or similar documentary or electronic material made or received by any segment of Monsanto in the performance of its responsibilities.

Any Index entry that refers to a record is considered a part of that record.

Retention Period Expressed As A Certain Number of Years — The document should be disposed of after the specified number of years have passed, on the anniversary of its creation, or, at the latest, by June 30 following that anniversary.

After Microfilming — Once the record has been microfilmed, the paper record should be disposed of immediately unless this manual specifically instructs otherwise.

After Review — Indicates that the record may be destroyed only after it has been reviewed by the office indicated. That office has the authority to extend the retention time of the record for specific reasons.

Year Originated — Means the calendar year during which the record was originated or acquired. "Year originated +1" means that if the document was originated this year, it is to be kept the rest of this year plus one more year.

Completion — Indicates the completion of a defined project or file.

Examples are:

- a research project
- expiration of a patent
- a lawsuit
- design or construction of a facility

Where statutory or regulatory requirements specify the retention of a report or data for a prescribed time period, the "completion" date is the end of that time period.

How To Use This Manual (Continued)

"Completion + 3 years" means that records are to be kept until the third anniversary of the project's completion date.

Permanent — Indicates that the record should be retained as long as Monsanto continues in business, or until legal counsel reviews and determines whether further retention is useful or required.

Purpose Served — "Purpose" may refer to a legal, governmental or patent purpose, or to a quality or cost control purpose, or to a statistical study of process variables.

Superseded — Indicates that the record has been replaced by a modified or new record.

"Until 10 years after superseded" means that a record is to be kept until the tenth anniversary of the date on which it was superseded.

Termination — Indicates the end of an activity or the use of a file. For example:

1) When used with HR records, "Terminated" indicates termination of employment.

2) When used with Contract or Agreement records, "Terminated" indicates the completion of the performance required of all parties under the contract.

3) "Until 3 years after termination" indicates that the record is to be kept until the third anniversary of the termination date.

While Useful Only — Indicates that there is no statutory or general business requirement for retention for a specified period of time. The document should be destroyed when, in the judgment of the person reviewing the files, it no longer serves a useful business, legal or research purpose. If the manual says that a copy of an original document is to be retained "while useful only," the copy should never be kept longer than the retention time specified for the original document. If the original document

is destroyed prior to the stated retention time, the copy should be maintained as if it were the original document.

Summary

1. All files, desks, credenzas, computers, disks and bookshelves must be cleared of unnecessary documents once each year before June 30.
2. It is the responsibility of the unit head to see that this file review is accomplished in accordance with this Records Management Manual.
3. A certificate of compliance letter from each Unit Vice President, Corporate Staff Department Director or applicable EMC Member must be received by the Office of the Corporate Secretary by June 30 of each year.
4. Any questions about this manual should be directed to the Office of the Corporate Secretary.

I. Administrative

Manuals:

| | |
|--|---|
| 1. Policy Manuals — and other Corporate Department or Operating Unit directives which express or interpret Company policy. (See also Chapter VI, ENGINEERING and Chapter XI, MANUFACTURING) | Retention Time |
| • Originating office file copy | Until 10 years after superseded |
| • Other copies | Until superseded |
| • Drafts & work papers | Until completion of manual, or less if not useful |
| <hr/> | |
| 2. Procedural Manuals — and other directives that are procedural only and do not express new policy or interpretation (includes Records Management Manual) | Retention Time |
| • Originating office file copy | Until 5 years after superseded |
| • Other copies | Until superseded |
| <hr/> | |
| 3. Safety Manuals & Instructions | Retention Time |
| • All copies | Until 10 years after superseded |

Reports:

| | |
|---|---|
| 1. Administrative — Internal Operating Unit and Corporate Departments | Retention Time |
| • Originating office file copy & one copy in Operating Unit's vice president's office | Year originated + 1 |
| • Other copies | Until superseded |
| • Drafts & work papers | Until completion of report, or less if no longer useful |
| <hr/> | |
| 2. Annual (year-end or last quarter) to the President | Retention Time |
| • Originating office file copy and work papers | Year originated + 6 |
| • President's office file | Year originated + 1 |
| • Other copies | 2 months |
| <hr/> | |
| 3. Quarterly - to the President | Retention Time |
| • Originating office file copy and work papers | Year originated + 2 |
| • President's office file | Year originated + 1 |
| • Other copies | 2 months |

II. Communications

A. External:

Communications from Monsanto to Outside Audiences.

| | |
|---|---|
| 1. Advertising | See "Marketing" chapter, Page 53. |
| 2. Public Relations — Press or News Release — or other Company publications such as Monsanto Pledge or Monsanto Magazine | Retention Time |
| • Public Relations Department file copy | Year originated + 50 |
| • Other copies as correspondence | Year originated + 1 |
| • Unreleased drafts | Until no longer useful, but in no case longer than 1 year |
| 3. Published Papers & Speeches — Revealing new policy, financial performance, or scientific and technical accomplishments of Monsanto | Retention Time |
| • Public Relations Department file copy | Year originated + 50 |
| • Patent Department copy | Year originated + 3 |
| • Research Information Center copy on microfilm | Permanent |
| 4. Shareowner — Reports, etc., to shareowners of Monsanto | Retention Time |
| • Annual Report copy in Corporate Secretary's office file | Permanent |
| • Copy of all other shareowner communications in Corporate Public Relations Department file | Year originated + 50 |
| • Other copies | Year originated + 1 |
| • Unreleased drafts of the above | While useful only |
| 5. Other — Having scientific, technical, educational, trade, or other orientation, but not revealing previously unpublished policy, financial performance, or proprietary technology | Retention Time |
| • Originating office copy, including work papers | Year originated + 1 |
| • Other copies | Year originated + 1, or less if no longer useful |

II. Communications (Continued)

B. Internal:

Communication Records Generated Inside Monsanto for Internal Use.

| | Retention Time |
|--|---|
| 1. Chronological Files & Reading Files | 1 year |
| 2. Correspondence related to other records with specified retention times | Retention Time Same as record to which it relates |
| 3. Correspondence of Temporary Value — Having neither informational value nor evidential value after action has been taken, or informational copies which require no action | Retention Time Immediate disposal |
| 4. Forms — General business and operating (not involving contracts, purchasing, labels, employee records) not otherwise noted in this manual | Retention Time |
| • Copy or master plates in originating office file | Until 5 years after superseded |
| • Other copies | Until superseded |
| 5. Publications — Monsanto-originated catalogs and brochures for internal use | Retention Time |
| • Originating office file copy | Until 5 years after superseded unless in Archives |
| • Other copies | Until superseded |
| 6. Publications — Other than Monsanto-originated catalogs and brochures for internal use | Retention Time |
| • Originating office file | Until 5 years after superseded unless in Archives |
| • Other copies | Until superseded |
| 7. Transcribed Shorthand Notes — Transcribed dictation tapes, voice mail, voice recordings | Retention Time Dispose of tapes, notes and recordings within 21 days after transcription |
| 8. Visitor Logs | Retention Time |
| • General logs of office and plant visitors in location file | Year originated + 5 |
| • With "Keep Confidential" agreement as prescribed by Security Manual in location file | Year originated + 5 |
| • Company logs—copy in Marketing file | Year originated + 6 and after tax audit |

II. Communications (Continued)

C. Photographs:

Media Originated by Monsanto for Internal or External Use.

- **Photography, Videotapes and Film** — Monsanto-related media produced by Monsanto or others — are to be retained in accordance with the retention period for the record category to which photographs pertain. For example:

| | Retention Time |
|--|---|
| • Photographs as Evidence — Relating to patents, trademarks, contract compliance, insurance, litigation (actual or potential) | In accordance with the retention period for the record category to which the photos pertain |
| • Photographs for Publicity — Submitted with or as a news release or a press communication | Keep photo as long as press release |
| • Photographs for Advertising | While potentially useful for advertising, unless otherwise instructed |
| • Photographs for Engineering Design — With Project Engineering Manual | Keep photo as long as associated design records are kept |

NOTE: *Photographs retained for specific purposes (including historical purposes) should be accompanied by adequate identification of purpose, location, people, products, time, etc., as needed to assure that the photograph is a complete record.*

D. Other:

| | |
|---|---------------------------------------|
| 1. Telephone Directories | Retention Time |
| • Copy of Monsanto directory in originating office file | Until 3 years after superseded |
| • Other copies | Until superseded |
| • External directories | Until superseded |
| 2. Trade Associations — Bulletins, reports, committee activity | Retention Time |
| • Adminstrating office file copy | Until superseded or while useful only |

III. Computers & Data Processing

1. **Programs** — Descriptions, process charts, program listings, operating instructions, etc. — all automatic data processing devices.

Note: Generally the records of programs will be retained only until superseded. More extended retention periods may be required in some instances to satisfy the following requirements:

- **Accounting Related Data Processing** — Sufficient records of programs must be maintained to satisfactorily support or validate any report which is subject to audit, if the program or report generation procedure is not self-evident in the report.
- **Non-Accounting Related Data Processing** — Sufficient records of programs must be maintained to satisfactorily support, validate, or permit reconstruction of any generated or calculated data which may serve evidentially — in contract compliance, demonstration of engineering competence, etc. — if the program or calculation procedure is not self-evident in the generated data or report. These must be brought to the attention of data processing groups by the users of data when the circumstances exist. Programs relating to reconstruction of any generated or calculated data which may serve evidentially in patent matters should be kept for the life of the patents plus 6 years beyond expiration of any patent-related agreement to which the program pertains.
- **Core Memory** — Any machine using "core memory" must either be administratively erased or have the core memory physically removed and destroyed prior to disposal of the machine, with the records in "core memory" retained in paper form within the retention times specified below.

Retention Time

- Patent Law Department's Patent Data System and Agreement Data System

25 years after system is superseded

2. Data & Information Recorded in Machine

Sensible Form — Including punched cards, magnetic tapes, disks, main frames, electronic data systems, electronic mail, networks, indexes to disks, but not optical and other read-only disks:

- Serving as, or replacing a source
- Recorded for data processing only
- Retaining information reports, summary calculations, serving as a ledger, etc.
- Hard Copy Reports
- Magnetic Data
 - Tapes
 - Disks
 - Diskettes
 - Microfilm, microfiche
 - Optical Disks

Retention Time

Same as the source document being replaced

While useful, but no longer than the source document from which recorded

If machine sensible form is the only recording, retain as specified for the paper record. Otherwise, retain while useful, but no longer than specified for the record in any other form

In accordance with the requirements for the business records produced

In accordance with the requirements for the business records produced

3. **Data and Information Recorded on Optical and Other "Read-Only Memory" Disks** which do not allow for selective deletion or printing of single document

Retention Time

Until the expiration of the longest retention period of any document on the disk

III. Computers & Data Processing (Continued)

| | |
|--|---|
| 4. Documents in In-Basket, messages log and trash file of electronic mail systems such as HP Desk | Retention Time Automatically deleted per individual system design at a minimum of every 60 days. Delete sooner than system designed retention if no longer useful. If the documents are listed in this manual and given a retention time, they should be saved on paper or in a computerized folder or other format designed for long-term storage. |
| 5. Documents on obsolete disks and workstations | Retention Time Convert information to usable format, or save information on obsolete disks with provision for conversion if necessary (Have MIS erase obsolete workstations and any obsolete disks not used to store records) |
| 6. Printouts of accumulated or processed data | Retention Time In accordance with the appropriate retention time for the document |

Note: The following computerized records or magnetic tapes must be retained until notification from Tax Department:

- General Ledger
- Voucher Register/Distribution
- Master Property List
- Year-End Tax Depreciation Computations
- Tax Report Reserves—Report R-31
- EDP Programs, Layouts, etc., necessary to print the above records

Note to Computer Users: Computer data in magnetic forms generally have a destroy date encoded. This date is recognized by the computer, and the data erased at that time.

It is the responsibility of the user, working with the MIS staff, to properly identify and encode the retention time for data systems. Users of on-line, interactive or terminal systems bear the responsibility for establishing and inputting proper retention times for their data.

Note to Electronic Mail Users: Monsanto communication equipment and services are intended for business purposes. As a result all electronic communications created within or sent in the Company are considered the property of Monsanto and may be viewed by authorized representatives of the Company if there is a business reason so to do. The privacy of such documents and messages is not guaranteed.

IV. Contracts & Agreements

General Provisions

In order to apply a retention time to a contract-related record, you must first establish a termination or expiration date for the contract.

For records management purposes, a contract is terminated when all of the following have occurred:

- There has been performance by all parties under all provisions of the contract or agreement. All work has been performed and payment made.
- The term of any guarantee, warranty or indemnification has expired.
- If the contract has a "hold confidential" clause, it will not be terminated until the confidential matter can be released.
- There has been complete satisfaction of any claim by or against the Company which may have arisen because of the contract.
- The document is deemed to have no future value as essential evidence to maintain or protect Company Confidential know-how, to defend the Company from claims or to assist the Company in asserting claims.
- There are no unresolved capitalization or expense tax problems.

A termination date should be established when a contract is signed. Alternatively, an outline of the circumstances which define termination of the contract should be written. A future review time should be set, in order to establish a definite termination date.

Major Contract

For the purposes of this manual, a "major contract" has one or more of the following features:

- A commitment for purchase or sale of products, raw materials, services or supplies in connection with normal commercial operations exceeding:
 - \$5,000,000 in one year, or
 - \$10,000,000 in five years, or
 - \$15,000,000 in fifteen years.
 - A commitment to acquire, sell, or construct a capital asset, if the total consideration exceeds \$500,000.
 - Provisions involving the acquisition, organization or dissolution of a corporation or contractual joint venture.
 - Provisions for the acquisition, sale or licensing of patents or know-how.
 - Provisions that, in the judgment of the attorney preparing or reviewing the contract, necessitate retaining it for more than six years after completion because of special circumstances such as:
 - The magnitude and importance of contract obligations,
 - The fact that liability may not be ascertainable for a substantial period of time after the time stated for performance of the contract,
 - Difficulty of determining the date on which performance by the parties under the contract will be completed.
-

IV. Contracts & Agreements (Continued)

Supporting Papers, Correspondence, Etc.

Unless otherwise specified, Law Department copies of supporting papers, correspondence, etc., collected in connection with the preparation of contracts and agreements covered in this section should be retained until execution of the contract and/or completion of negotiations, and should be reviewed by the Law Department before destruction.

Copies of such records which are retained elsewhere than in the Law or Patent Department files should be retained for one year after execution of the contract and/or completion of negotiations.

Unless otherwise specified, Patent Department copies of supporting papers, correspondence, etc., collected in connection with the preparation of contracts and agreements covered in this chapter shall be retained until 6 years beyond the termination of the contract, or until completion of negotiations if the contract was approved by the Patent Law Department but not executed, and will then be reviewed by the Patent Department before such records are destroyed.

All papers generated in connection with abandoned negotiations on contracts or agreements should be retained for one year after abandonment.

Retention Periods For Specific Types of Contracts

| 1. Bills of Lading | Retention Time |
|---|--|
| • Domestic — in responsible office file | Year originated + 6 and after tax audit |
| • Export — in responsible office file | Year originated + 6 and after tax audit |
| • Other copies | Year originated + 6, or less if no longer useful |

2. Contracts Individually Prepared — by Law Department or Patent Department for purchase, sale, patent license, know-how, consultation, etc.

Retention Time

Major, Retained by Office of Corporate Secretary:

| | |
|---|--|
| • Company (signature) copy in Corporate Secretary's vault | Until 10 years after termination of contract; but note Item 12 in this chapter |
| • Conformed signed copy in Operating Company or staff department file | Until 6 years after termination of contract; but note Item 12 in this chapter |
| • Other conformed copies | Until termination of contract |

Note: *If a given transaction is governed by more than one major contract, all of the contracts should be kept until ten years after the termination of the contract which terminates last. This standard shall also apply to major contracts approved by the Law Department but not executed.*

Minor, Not Retained by Office of Corporate Secretary:

| | |
|---|---|
| • Company (signature) copy in originating or administrating office file | Until 6 years after termination of contract; but note Item 12 in this chapter |
| • Other conformed copies | Until termination of contract |
| • Technical Consulting | Until 10 years after termination of the consulting period and after review |

Note: *This standard shall also apply to minor contracts approved by the Law Department but which are implemented on an ad hoc basis without signature.*

IV. Contracts & Agreements (Continued)

| | |
|--|---|
| 3. Employment Contracts & Agreements — on approved, printed Monsanto forms | Retention Time |
| <ul style="list-style-type: none">• Company (signature) copy in Payroll Department file• Other copies | Duration of employment + 20 years For duration of employment |
| 4. Government (U.S.) Contracts | Retention Time |
| <ul style="list-style-type: none">• Company (signature) copy in originating or administering office file or conformed copy at location of government audit | In accordance with retention period for non-government contracts unless a time is set by the terms of the specific contract and any relevant renegotiations |
| 5. Labor Contracts | Retention Time |
| <ul style="list-style-type: none">• Company (signature) copy and essential work negotiation papers in division or location file• Other copies, work and negotiation papers | Until 20 years after termination of contract Until 20 years after termination of contract |
| 6. Leases — (excluding Real Estate) See also "Shipping, Storing and Transportation Equipment," page 64; also item 12, page 19 of this chapter | Retention Time |
| <ul style="list-style-type: none">• Company (signature) copy in originating or administering office file• Other copies | Until 6 years after termination of the lease Until termination of the lease |
| 7. Material Exchange Agreements/Conversions | Retention Time |
| <ul style="list-style-type: none">• Company (signature) copy in division file• Other copies | Until 6 years after termination of the contract Until termination of the contract |
| 8. National and Area Purchase Agreements and Related Records | Retention Time |
| <ul style="list-style-type: none">• Company copy in Purchasing Department file• Other copies and excerpts | Until 2 years after termination of contract Until termination of contract |
| 9. Product Warranties | Retention Time |
| <ul style="list-style-type: none">• Company (signature) copy in division file | Until 6 years after termination of warranty or discontinuance of product sale |
| 10. Purchase Orders — Including essential related papers | Retention Time |
| <ul style="list-style-type: none">• Originating purchase office file copy• Engineering, maintenance, storeroom, supply depot or other requisitioning and receiving office file• Research record copy maintained with notebook in connection with experimental work | Until 1 year after termination of contract Until termination of contract, or less if no longer useful Year originated + 25; microfilm before destroying. Keep microfilm permanently |

IV. Contracts & Agreements (Continued)

11. Sales Contracts and Agreements — *on approved printed Monsanto forms*

Retention Time

Major Contracts:

- Executed Company
(signature) copy
- Other executed copies
- Specimen copy of forms

Until 10 years after termination of contract

Until termination of contract

Until superseded + 5 years

Minor Contracts:

- Executed Company
(signature) copy
- Other executed copies
- Specimen copy of forms

Until 6 years after termination of contract

Until termination of contract

Until superseded + 5 years

12. Construction, Maintenance and Third Party Service **Contracts, including Transportation Services** — which require indemnity or certificates of insurance from the contractor or service provider.

Retention Time

- Original signature copy
- Other copies

Permanent

See item 2 this chapter

V. Corporate Records

These records pertain to the formation, continuation, and dissolution of corporate bodies. Monsanto Company is the principal corporation. The records pertaining to the formation and continuation of Monsanto Chemical Works and any company which was merged with Monsanto are considered, for the purposes of this manual, to be corporate records of Monsanto Company.

A. General Records:

1. Acquisitions, Mergers, Consolidations, Reorganizations, Dissolutions, Joint Ventures, etc.

- Company records in file of secretary of the corporation involved
- Papers, correspondence, drafts, etc., collected in connection with negotiations and preparation
- Due diligence studies and documents

Retention Time

Permanent if stock acquisition is involved;
50 years if purely asset acquisition

While useful only

First review, year of origination + 7. Review before destroying. Subsequent reviews, every 5 years until records can be destroyed

2. Certificates of Incorporation

- Company copy in file of secretary of the company involved

Retention Time

Permanent

3. Corporate Guide — Data and information concerning subsidiary, associated and affiliated companies of Monsanto

- Company copy in Office of Corporate Secretary file
- Other copies

Retention Time

Until 2 years after superseded

Until superseded

4. Corporate Secretary's Records — Data and information concerning directors, officers, and other company personnel, committees of directors, as essential for preparing corporate reports and applications

Retention Time

Until superseded or report completed

5. Minutes, Committees of Directors —

Executive, Finance, Budget, Bonus, Audit, etc.

- Company copy and underlying papers in file of secretary of the company involved, or in file of secretary of committee in keeping with assigned responsibility
- Copies and excerpts in all other offices

Retention Time

Permanent

Year originated + 1

V. Corporate Records (Continued)

| | |
|--|-----------------------|
| 6. Minutes, Corporate — Stockholders and directors meetings | Retention Time |
| • Company copy and underlying papers submitted for action in file of secretary of the company involved | Permanent |
| • Copies and excerpts in all other offices | While useful only |

| | |
|---|-----------------------|
| 7. Qualifications to do Business and Related Records | Retention Time |
| • Company copy in file of secretary of the company involved | Permanent |

B. Securities/Stock Records:

| | |
|---|--|
| 1. SEC, Reports to | Retention Time |
| • Company copy in file of secretary of the corporation involved | Year originated + 40 |
| • Other copies and work papers | Year originated + 5, or less if not useful |

| | |
|--|---|
| 2. Securities, Evidence Thereof — Listing applications, registration statements, etc. | Retention Time |
| • Company copy in file of secretary of the corporation involved: | |
| • Stock and securities convertible into stock | Until 25 years after security termination |
| • Securities non-convertible into stock | Until 10 years after security termination |
| • Other files | While useful only |

| | |
|--|-----------------------|
| 3. Stock Certificates, Cancelled | Retention Time |
| • Company copy in stock records file of corporation involved | Year cancelled + 15 |

| | |
|--|-----------------------|
| 4. Stock Certificates, Lost — Affidavits & records | Retention Time |
| • Company copy in stock records file of corporation involved | Year originated + 50 |

| | |
|--|--|
| 5. Stock Transfer Sheets | Retention Time |
| • Company copy in stock records file of corporation involved | Year originated + 1; then microfilm and permanently retain microfilm |
| • Other copies | While useful only |

V. Corporate Records (Continued)

C. Shareowner Records:

| | |
|--|--|
| 1. Proxies & Proxy Lists | Retention Time |
| <ul style="list-style-type: none">• Company copy in stock records file of corporation involved | Year originated + 3 |
| 2. Shareholder Inquiries Concerning Holdings | Retention Time |
| <ul style="list-style-type: none">• Company copy in stock records file of corporation involved | Year originated + 5 |
| 3. Shareholder Ledger | Retention Time |
| <ul style="list-style-type: none">• Company copy in stock records file of corporation involved — on microfiche• Other copies of record date printouts | Permanent While useful only |
| 4. Shareholder, Reports to — The stated retention time for these records presumes continuation of the corporation. If the corporation is dissolved, these records will be retained for 5 years after termination of the corporation | Retention Time |
| <ul style="list-style-type: none">• Copy of Annual Report in Office of Corporate Secretary file• Copy of all other communications in originating office file• Forms 10-K, 10-Q, Proxy Statements• Registration Statements on Forms S-1, S-2, S-3, S-8, S-14 | Permanent Year originated + 50 Permanent 30 years |

VI. Engineering

(Note: Enviro-Chem engineering and construction records are subject to the retention times in the special Enviro-Chem part of this Section on page 25.)

A. Drawings:

| | |
|---|---|
| 1. Facility Engineering Drawings | Retention Time |
| <ul style="list-style-type: none">• Company file of tracings, microfilm or computer-aided drawings (CAD) of copies in Chemical Group Engineering and Agricultural Group Engineering (hereinafter CGE/AGE), Operating Company or plant file• Other copies | <p>Until 10 years after termination of the facility</p> <p>Until termination of the facility, or less if no longer useful</p> |
| 2. Product Engineering Drawings | Retention Time |
| <ul style="list-style-type: none">• Company copy of tracings, prints, microfilm and CAD in responsible office file• Other copies | <p>Until 10 years after termination of product</p> <p>Until termination of product, or less if no longer useful</p> |

B. Manuals:

| | |
|---|---|
| 1. Product Project Engineering Manuals — Description, design, instructions, etc., for manufacture of fabricated or assembled products | Retention Time |
| <ul style="list-style-type: none">• Company copy in responsible office file• Patent Department copy• Other copies | <p>Until 10 years after termination of product</p> <p>Until 10 years after termination of product</p> <p>Until termination of product</p> |
| 2. Project Design Manuals — Description, design, instructions for capital addition, improvement projects, plus Scope Reports and CEAs/EAs | Retention Time |
| Installed Projects and Subsequent Revisions: | |
| <ul style="list-style-type: none">• Company copy in CGE/AGE Information Center central file• Division and plant copy• Construction copies | <p>Until 10 years after termination of facility</p> <p>Until termination of facility</p> <p>Until 1 year after completion of facility</p> |
| Abandoned Projects: | |
| <ul style="list-style-type: none">• Company copy in CGE/AGE Information Center file if project report assembled• Relevant work papers if no report assembled | <p>Until 10 years after termination of project</p> <p>Until 5 years after termination of project</p> |

VI. Engineering (Continued)

C. Project Files:

| | |
|---|---|
| 1. CGE/AGE Project Files — CGE/AGE closed project files prepared in accordance with CGE/AGE procedure 106 | Retention Time Until 10 years after completion of project |
| 2. CGE/AGE Project Support Files Not Included in Above Project — Engineering development records, file lab data, documentations, calculations, programs resulting from development work in Engineering Technology and D&C Branches | Retention Time |
| Including: | |
| • CGE/AGE — Purchasing Department master purchase order files | Until 5 years after completion of project |
| • CGE/AGE — Purchasing Department CGE/AGE files | Until 5 years after completion of project |
| • CGE/AGE — Accounting Department purchase order files | Until 5 years after completion of project |
| • Project status reports from Financial and Operations Analysis | Until 5 years after completion of project |
| • Engineering Activity reports from Financial and Operations Analysis | Until 5 years after completion of project |

D. Technical:

| | |
|---|--|
| 1. Engineering Technical Reports — Technology of value, not specific capital addition or improvement project | Retention Time |
| • Company circulating copy in CGE/AGE central files, local library or Technical Information Center files | Year originated + 35 |
| • Originating office copy, work papers and drafts | Until 1 year after completion of project |
| 2. Engineering Technical Information — Not specific to Monsanto project, facility, product or proprietary know-how, and not library material | Retention Time |
| • All copies | Until superseded, or less if no longer useful |
| 3. Environmental Control Data — for engineering analysis and design purposes | Retention Time Until completion of project, unless a longer period is required by law or legal proceedings |

VI. Engineering — Enviro-Chem Systems, Inc.

The retention times listed below apply only to Monsanto Enviro-Chem Systems, Inc., ("MEC"). For MEC, completion of a construction or design project (contract) is defined as receipt of a letter of acceptance and payment of final invoice from the client. On unsuccessful proposals and estimates, completion is defined as the date of the last correspondence with the client.

Note: In addition to the retention times specified in this section, see item 12 under the "Contracts & Agreements" chapter, page 19.

A. Construction:

| | |
|--|--|
| 1. Daily Report | Retention Time Until 10 years after completion |
| 2. Local Craft Labor Agreement — Work rules | Retention Time Until 20 years after completion |
| 3. Progress Photos | Retention Time Until 10 years after completion |

B. Project Control:

| | |
|---|--|
| 1. Project Cost and Schedule History | Retention Time Until 10 years after completion |
|---|--|

C. Project Management:

| | |
|--|--|
| 1. Contract and Related Correspondence | Retention Time Until 10 years after completion |
| 2. Project Cost Report <ul style="list-style-type: none">• Final copy | Retention Time Until 10 years after completion |
| 3. Project Schedule <ul style="list-style-type: none">• Final copy | Retention Time Until 10 years after completion |
| 4. Variation Orders and Related Correspondence | Retention Time Until 10 years after completion |

VI. Engineering — Enviro-Chem Systems, Inc. (Continued)

Project Records:

D. Engineering Documents:

| | |
|--|--|
| 1. Correspondence Relating to Design | Retention Time Until 5 years after completion |
| 2. Design Data and Calculations | Retention Time Until 10 years after completion |
| 3. Design Summaries — Reduced print books | Retention Time Until 10 years after completion, or less if no longer useful |
| 4. Drawings, Bills of Materials, Specifications <ul style="list-style-type: none">• Originals (Master/Tracing)• Other copies | Retention Time Until 30 years after completion Until 1 year after completion, or less if no longer useful |
| 5. Foreign Drawings — Prepared by other than MEC | Retention Time Until 10 years after completion |

E. Purchasing:

| | |
|---|--|
| 1. Commitment Sheet | Retention Time Until 30 years after completion |
| 2. Material and Equipment Status Report | Retention Time Until 30 years after completion |
| 3. Operating/Maintenance Manuals | Retention Time Until 1 year after completion |
| 4. Purchase Order Files <ul style="list-style-type: none">• Prime copy including subcontracts• Other copies | Retention Time Until 10 years after completion Until 1 year after completion, or less if no longer useful |

F. Proposals:

| | |
|---|--|
| 1. Proposals That Result in an Awarded Contract | Retention Time Transfer to active project file |
| 2. Proposals That Do Not Result in an Awarded Contract | Retention Time Until 3 years after completion |

VII. Environmental, Safety & Health (Previously Medical & Environmental Health Chapter)

A. General:

The retention time for records listed in this General subsection shall apply unless a specified record and retention time are listed in Sections B. through E. below.

1. Authorizations for Signatures to Documents

(for example, air, water, solid waste permit applications, periodic reports, required permits, etc.)

Retention Time

- Company copy in Environmental Law file Permanent*
- Other copies Until superseded

2. Company Guidance and Procedures

Retention Time

- Company copy of opinions and other records for legal guidance (internally and externally generated) in Environmental Law file Until no longer useful, or until superseded
- Company copy of other guidance and procedures in originating office file Until superseded
- Other copies Until no longer useful

3. Regulatory Agencies - Federal, State, County, Municipal (for example, discharge monitoring reports, Superfund spill reports, etc.)

Retention Time

a. Compliance and other records required by law to be submitted to the government, and OSHA Material Safety Data Sheets

- Company copy of compliance record and supporting data in originating office file As specified by law or regulation
- Company copy of noncompliance and other records supporting data in originating office file Permanent
- Drafts Until completion of record
- Other copies and excerpts While useful only

b. Compliance and other records required by law to be retained by the Company (for example, hazardous waste shipping manifests, financial assurance demonstrations, etc.)

- Company copy and supporting data in originating office file Unless otherwise instructed elsewhere in this Section, as specified by law or regulation or, in the case of medical records, until released by Department of Medical & Health Sciences (DM&HS) at a later date
- Other copies Until no longer useful

c. Government Contacts (for example, correspondence, records of meetings and telephone conversations with government regulators, etc.)

- Company copy of relevant correspondence and notes of conversations and meetings with government in originating office file Permanent
- Drafts Until completion of record
- All other copies While useful only

* "Permanent" for purposes of this subsection shall mean original hard copy is to be retained year originated + 20; then document may be retained in original form or stored by means of photographic, electronic or other means of copying and retained permanently.

VII. Environmental, Safety & Health (Continued)

| | |
|--|---|
| <ul style="list-style-type: none"> • Company copy of other documents pertaining to government contact (for example, third party correspondence, technical studies, allocation of liability, financial documents) in originating office file | Until no longer useful or as specified by law or regulation |
| d. Documents pertaining to permits, registrations, petitions, variances, waivers, orders, etc. | |
| <ul style="list-style-type: none"> • Company copy of applications and requests, supporting data used to complete applications and requests, draft permits and orders, comments and correspondence provided to or by the regulatory agency, and final copies in originating office and Environmental Law files | Permanent |
| <ul style="list-style-type: none"> • Other drafts | Until completion of record |
| <ul style="list-style-type: none"> • Other copies | While useful only |

4. Surveys and Audits

| Retention Time | |
|--|---|
| Until superseded or until no longer useful | <ul style="list-style-type: none"> • Company copy of surveys or assessments in the responsible office file or the Company Information Center |
| Permanent | <ul style="list-style-type: none"> • Company copy of the audit closure file (final report, action plan and plan resolution documents) in responsible office file |
| Until superseded | <ul style="list-style-type: none"> • Work papers, completed questionnaires, and other copies |
| Until completion of record | <ul style="list-style-type: none"> • Drafts |

B. Industrial Hygiene:

Company copy of records not required by law in originating office file.

| Retention Time | |
|---|---|
| Year originated + 1 | 1. Correspondence — Relating to reports |
| Retention Time | |
| Until completion of report, or until no longer useful, whichever occurs first | 2. Drafts — of reports |
| Retention Time | |
| Permanent | 3. Experimental Project Reports <ul style="list-style-type: none"> • Original copy |
| Retention Time | |
| Until completion | 4. LP & EC Reports, Environmental Assessments |
| Retention Time | |
| 3 years | 5. LP & EC Procedures and Checklists |

VII. Environmental, Safety & Health (Continued)

C. Medical:

- 1. Employee Medical History** — Documents containing health assessment and medical surveillance or monitoring program assessments, similar information for contract workers, requests for medical records and back-to-work clearance, injury reports for Monsanto employees and contractors' employees — records accessible to Medical Staff only

Retention Time

**World Headquarters and Other Locations
With Company-Operated Medical Facilities:**

- Company copy in medical facility file

As specified by law or regulation, or a later date specified by the Director - DM&HS

Locations Utilizing Retained Medical Facilities:

- Company copy in physician's or medical facility file
- Company copy in sealed record (opened only by physician) at office location if medical facility cannot retain

As specified by law or regulation, or a later date specified by the Director - DM&HS

As specified by law or regulation, or a later date specified by the Director - DM&HS

-
- 2. Employee X-Rays** — Files available to physicians only

Retention Time

- Files in all locations

As specified by law or regulation, or a later date specified by the Director - DM&HS

-
- 3. Narcotic Records** — All necessary orders, invoices, inventory or dispensing records

Retention Time

- Company copy in administering office file

Year originated + 2, unless longer retention time is specified by law or regulation

D. Toxicology:

- 1. Advisory Information on Toxicity** —
Written or telecommunications records

Retention Time

- Company copy in DM&HS file
- Other copies

Year originated + 10

Year originated only

-
- 2. Product Information** — Product application data assembled for sales guidance and manufacturing relating to raw materials and other substances, toxicity statements and data sheets

Retention Time

- Company copy in DM&HS file
- Other copies

Until 10 years after superseded

Until superseded

VII. Environmental, Safety & Health (Continued)

3. Study Reports — All Monsanto-sponsored toxicity studies

- Company copy of original or validated copy in DM&HS file
- Microfilm in DM&HS file
- Other copies

Retention Time

Year originated + 25, microfilm before destroying, retain microfilm permanently

After review by Law Department

Until study completed

E. Miscellaneous:

1. Automatic Continuous Area Monitoring Data and Other Plant-Monitored Data

Retention Time

Hard copy - 3 years; microfilm before destroying; retain microfilm permanently

2. OSHA Material Safety Data Sheets (MSDS) — Supporting data, and documents requesting or denying disclosure of confidential trade secret information in MSDS

Retention Time
Permanent

3. Personal Protection Equipment Selection Requirements

Retention Time
Permanent

4. Safety Training Records — For regular Monsanto employees and contractor employees

Retention Time
Permanent

5. OSHA - Individual Records — Maintained as required by 29 CFR 1910.20

Retention Time

30 years; longer if certain specific requirements apply or if DM&HS specifies

VIII. Financial

Pertaining to financial matters of the Company including receipt, disbursement and accounting of funds and measurement of financial performance.

A. Accounts Payable and Other Payments:

| | |
|--|---|
| 1. Daily Activity Reports — Invoice lists and corrected Resp. 0001 exception reports | Retention Time Year originated + 6 and after tax audit |
| 2. Daily Control Statements — Batch control reports, additions report, daily distribution summary and outbound freight daily activity summary | Retention Time Year originated + 1 |
| <ul style="list-style-type: none">Company copy in Accounts Payable Department file | |
| 3. Distribution Reports — Monthly distribution reports, corrected general ledger summary reports | Retention Time Year originated + 6 and after tax audit |
| <ul style="list-style-type: none">Company copy in Accounts Payable Department file | |
| 4. IRS 1099 Data | Retention Time |
| <ul style="list-style-type: none">Plant input formsFinal update & correction listingsEmployees' 1099 copy, all electronic, optical or other storage methodsUpdate and correction detail | All IRS 1099 data to be retained for year originated + 6 and after tax audit |
| 5. Invoices and Freight Bills — All accumulated data for payment of vendor invoices for goods, freight and other services, correction forms, replacement check detail and necessary related documents | Retention Time Year originated + 6 and after tax audit <i>Except: invoices for defense of insurable claims — permanent</i> |
| <ul style="list-style-type: none">Company copy in Accounts Payable Department file | |
| <ul style="list-style-type: none">Other office copies of invoices, freight bills and related documents | While useful only |
| 6. Payment Reports | Retention Time |
| <ul style="list-style-type: none">Semi-annual payment reportsDaily, bi-monthly and monthly payment reports | Year originated and after tax audit While useful only |

VIII. Financial (Continued)

| | |
|---|-----------------------|
| 7. Selected Accounting Reports — Weekly distribution report, corrected exception report, pickout reports, set-up reports, outbound freight shipper run, and MAG early monthly report | Retention Time |
| • Company copy in Accounts Payable Department file | Year originated |
| • Other copies | While useful only |

| | |
|---|-----------------------|
| 8. Status Reports — Debit balance report, past-due report, duplicate payment report, open item list and data management report | Retention Time |
| • Company copy in Accounts Payable Department file | Year originated |
| • Other copies | Until superseded |

| | |
|--|---|
| 9. Vendor Master File Activity List | Retention Time |
| | Year originated + 1 and after tax audit |

B. Accounts Receivable — and Other Receipts:

| | |
|---|---|
| 1. Cash Receipt Documents — Check photostats or microfilm, transfer-depository reports, distribution reports, etc. | Retention Time |
| • Company copy in administrating office file | Year originated + 3 and after tax audit |

| | |
|---|---|
| 2. Cash Receipts Ledger | Retention Time |
| Total Company: | |
| • Company copy & essential source documents in Central Accounting Department file | Year originated + 6 and after tax audit |
| • Other copies | While useful only |
| • Ledger reconciliations | Year originated + 6 and after tax audit |
| Local Funds: (Plant cafeterias; petty cash, etc.) | |
| • Company copy in administrating office file | Year originated + 6 and after tax audit |
| • Ledger reconciliations | Year originated + 6 and after tax audit |

| | |
|---|---|
| 3. Customer History Records — Any form | Retention Time |
| • Company copy in administrating office file | Year originated + 6 and after tax audit |

VIII. Financial (Continued)

4. Registers — Cash, control report, invoice, journal, split cash, washout

- Company copy in administrating office file

Retention Time

Year originated + 2 and after tax audit

5. Trial Balances

- Company copy in Accounting Department file
- Credit Department copy
- International Division copy
- Other copies

Retention Time

Year originated + 6 and after tax audit

Until superseded

While useful only

Until superseded

C. Audit:

1. External Audit Reports

- Company copy in Controller's Office file
- Other copies & excerpts

Retention Time

Year originated + 15

While useful only

2. Internal Audit Reports

- Company copy in Internal Audit file
- Other copies

Retention Time

Year originated + 15

While useful only

3. Tax Audits

Retention Time

See "Tax" Section, page 66.

D. Banking:

1. Bank Account Statements & Reconciliations

- Company copy in administrating office file

Retention Time

Year originated + 6 and after tax audit

2. Bank Resolutions

Board of Directors Minutes:

- Treasury Department copy
- Other copies

Retention Time

Until resolution is revoked + 6 years

Until resolution is revoked

VIII. Financial (Continued)

| | |
|--|---|
| 3. Bank Statements of Condition <ul style="list-style-type: none">Treasury Department file | Retention Time Until superseded |
| 4. Cancelled Checks & Check Registers — In files authorized by Treasury Department <ul style="list-style-type: none">Payroll, salary & wagesDividend, voucher and local working fund checks and registers | Retention Time Year originated + 3 Year originated + 6 and after tax audit |
| 5. Depository Receipts <ul style="list-style-type: none">Treasury Department fileAccounts Receivable Department file | Retention Time Year originated + 6 and after tax audit Year originated + 3 |

E. Billing:

| | |
|--|---|
| 1. Consigned Stock (Product) Ledger, Related Documents & Work Papers Domestic: <ul style="list-style-type: none">Company copy in Billing (or other preparing) Department fileOther copies International: <ul style="list-style-type: none">Company copy in International Division Accounting fileOther copies | Retention Time Year originated + 1 While useful only 6 years and after tax audit While useful only |
| 2. Debit & Credit Source Documents <ul style="list-style-type: none">Company copy in Billing Department fileOther copies | Retention Time Year originated + 1 While useful only |
| 3. Invoices, Debits & Credits — Pertaining to supply of goods and services by Monsanto <ul style="list-style-type: none">Company copy in Billing Department file including essential related papersOther copies of invoices and related papers | Retention Time 6 years and after tax audit While useful only |

VIII. Financial (Continued)

| | |
|--|-----------------------|
| 4. Returnable Container Inventory Ledger | Retention Time |
| • Company copy in Billing (or other preparing) Department file | Year originated + 2 |
| • Other copies, excerpts, and source or related documents | While useful only |

| | |
|--|-----------------------|
| 5. Returnable Container Receiving Reports | Retention Time |
| • Company copy in Billing Department file | Year originated + 1 |
| • Other copies, and source or related documents | While useful only |

| | |
|--|-----------------------|
| 6. Shipping Papers (Intra-company) — and other requests for billing, also related and essential work papers | Retention Time |
| • Company copy in Billing Department file | Year originated + 2 |
| • Other copies | While useful only |

F. Budget:

| | |
|--|-----------------------|
| 1. Actual vs. Budget Financial Reviews - Quarterly, Annual, Special | Retention Time |
| • Company copy & work papers in Controller's Office file | Year originated + 5 |
| • Other copies & excerpts | While useful only |

| | |
|---|-----------------------|
| 2. Actual vs. Budget Reports for Expenses — All MAT departments, plant service departments, etc. | Retention Time |
| • Company copy in Controller's Office file | |
| • Monthly | Year originated + 1 |
| • Year-end | Year originated + 10 |
| • Other copies & excerpts | While useful only |
| • Patent Department Director's files - year-end | While useful only |

| | |
|---|-----------------------|
| 3. Budget Documents, All — for expenses, sales, income, etc. (annual budget books, budget statements, all excerpts, work papers, etc.) | Retention Time |
| • Company copy in Controller's Office file | Year originated + 10 |
| • Other copies & excerpts | While useful only |

VIII. Financial (Continued)

4. Product Group Data Books — and essential work papers

- Company copy in Controller's Office file
- Other copies & excerpts

Retention Time

Year originated + 10
While useful only

5. Utilization Plant Facilities — Actual vs. capacity reports

- Company copy in Controller's Office file
- Other copies & work papers

Retention Time

Year originated + 10
While useful only

G. Capital Expenditures & Property Records:

1. Appropriation & Retirement Requests

Retention Time

Above Managing Director Approval:

- Controller's Office copy
- Corporate Planning and Evaluation or Patent Department copy, including work papers or approved and unapproved requests
- Originating company or department copy and work papers
- Other copies

Until 10 years after completion of project

Year originated + 10, or less if no longer useful

Until 10 years after project completion or less if no longer useful

Year originated + 1, or less if no longer useful

Managing Directors' or Managing Director's Delegated Approval:

- Company copy in originating Operating Company file

Until 5 years beyond project completion

2. Construction Expense Data - Company Construction Programs

Retention Time

- Company copy, work papers, and other data records for forecast of corporate expenditure in Controller's Office file
- Other copies, work papers, etc.

Year originated + 5

While useful only

3. Oil & Gas Lease Transaction Records — Undeveloped mineral rights lease record folder and file (LD forms) included therein

- Company copy in originating Operating Company accounting department file
- Other copies
- Journal entries

Retention Time

Until termination of lease + 6 years and after tax audit

While useful only

Year originated + 25

4. Project Performance Reports — Appropriation Requests vs. Actual

- Company copy in Controller's Office file
- Other copies, work papers, etc.
- Journal entries

Retention Time

Until completion of project + 10

Until completion of project + 3

Year originated + 25

VIII. Financial (Continued)

5. Property Additions & Construction Records — In file of Operating Company:

- Forms, tabulations & work papers establishing asset value

Retention Time

Year originated + 10 and after tax audit

Property Inventory Record (Property Cards):

- Active equipment files
- Retired equipment files

Until retirement of equipment

Year originated + 10 and after tax audit

6. Property Master Listings (Tabulation Printout)

Retention Time

- Company copy in file of Operating Company Accounting Department
 - Bi-monthly listings
 - Year-end listings
- Other copies

Year originated + 2

Year originated + 10 and after tax audit

While useful only

7. Property Repair Records

Retention Time

- Major or minor authorization and records of cost

Year originated + 10 and after tax audit

8. Property Retirement Records

Retention Time

- All forms, work papers & tabulations establishing amount of asset retired in file of Operating Company

Year originated + 10 and after tax audit

9. Property Transfer Records

Retention Time

- Forms, work papers & tabulations in file of Operating Company

Year originated + 2

10. Statement of Capital Additions & Replacement by Company & Summary for Directors

Retention Time

- Copy in Corporate Engineering Department accounting file
- Other copies, plant reports, work papers, etc.

Year originated + 10

While useful only

VIII. Financial (Continued)

H. Company Ledger, Financial Statements & Reports Of Finances:

1. Company to Shareholder Reports —

(Annual Reports, etc.)

[See page 22.]

2. Financial Statements - Foreign Subsidiaries —

Statements in foreign currency translated to U.S. currency by International Division

Retention Time

- Company copy in International Division Accounting Department file

Year originated + 5

3. Financial Statement - Monsanto Company —

Documents which report the financial circumstances (balance sheet and P&L) of Monsanto Company, and of the Operating Companies, subsidiaries, and other segments entering the consolidated statement

Retention Time

- Company copy & essential work papers in Controller's Office file
- Board of Directors' minutes copies
- Other copies

Year originated + 25

Permanent

While useful only

4. General Ledgers — of all Operating Company & staff departments

Retention Time

- Company copy in Controller's Office file
- Other copies

Year originated + 25

While useful only

5. Journal Entries

Retention Time

- Company copy in originating office file
- Other copies
- Journal entries recording oil & gas undeveloped mineral rights lease transactions for any units of Monsanto and Lion Oil Company

Year originated + 10 and after tax audit

While useful only

Year originated + 25

6. SEC Annual Report & work papers

[See page 21.]

VIII. Financial (Continued)

I. Cost:

| | |
|--|--|
| 1. Cost & Service Reports | Retention Time |
| • Company copy in Operating Company Accounting Department file | Year originated + 10 and after tax audit |
| • Other copies | While useful only |

| | |
|--|--|
| 2. Cost Standards — Including work papers | Retention Time |
| • Company copy in Operating Company file | Until 10 years after superseded, or less if no longer useful |
| • Other copies | While useful only |

| | |
|---|--|
| 3. Ledgers — Raw materials, goods-in-process, and finished goods | Retention Time |
| • In Operating Company Accounting Department file | Year originated + 10 and after tax audit |

J. Profitability:

| | |
|--|-----------------------|
| 1. Profit by Products & Product Groups | Retention Time |
| • Company copy in Operating Company Accounting Department file | Year originated + 10 |
| • Other copies | While useful only |

| | |
|---|-----------------------|
| 2. Profitability Studies — by industries, trade areas, countries, etc. | Retention Time |
| • Company copy in Operating Company Accounting Department file | Year originated + 10 |
| • Other copies | While useful only |

K. Miscellaneous:

| | |
|--|---------------------------------|
| 1. Accounting & Budget Procedures, Directives & Manuals | Retention Time |
| • Copy in originating office file | Until 10 years after superseded |
| • Other copies | Until superseded |

VIII. Financial (Continued)

2. Expense Reports & Travel Statements of Personnel

Retention Time

- Company record in file of accounting office making payment:
 - Reports of employees engaged directly in government contract work
 - Reports of all other employees
- Other copies — all reports

Year originated + 4 and after tax audit

Year originated + 3 and after tax audit

While useful only

3. Individual Authorizations for Expenditures

Retention Time

- Copy in Internal Auditor file
- Other copies

Until superseded + 5

Until superseded

4. Renegotiation

Retention Time

- Sales records & work papers in Operating Company Accounting Department file

Until 3 years beyond completion or renegotiation of contract

Reports & Summaries:

- Company copy in Controller's Office file
- Other papers

Year originated + 25

Year originated + 1

5. Royalty Payments & Receipts Required by Contracts, Agreements, etc.

Retention Time

- Company copy in administrating office file
- Other copies

Until 6 years beyond expiration of agreement and after tax audit

Until expiration of agreement, or less if no longer useful

6. Vouchers — Oil & Gas Activities

Retention Time

- MCLC, MPPC, H&P Division or Lion Oil Company vouchers with accompanying tax returns issued prior to January 31, 1963
- Vouchers recording oil and gas undeveloped mineral rights lease transactions

Year originated + 50

Year originated + 25

IX. Human Resources & Payroll/Benefits (Previously "Personnel & Payroll" Chapter)

A. Benefit Records:

1. Employees with Vested Interests in Pensions, Insurance, Stock Options, etc.

- For salaried employees, Company copy in Personnel/Payroll Department file
- Local copy in Company/department
- For wage employees, Company copy during employment: in Company or location file
- Company copy after termination or retirement in Personnel/Payroll Department file

Retention Time

Until death of employee and last surviving beneficiary
Until employee retires and commences benefits
Until employee retires or terminates, then transfer file to Personnel/Payroll Department
Until death of employee and last surviving beneficiary

2. Employees Not Vested

Retention Time

Until age 70

3. Medical Benefit Records

- Copy of employee's records in responsible office file
- Copy of employee's family records in responsible office file

Retention Time

Until released by Director, DM&HS
Year originated + 7

B. Employment Records:

Employment records not specified below — Company (original) copy (until 3 years after effective date of employee's separation from Monsanto).

1. Application and Attached Resume

Retention Time

If hired, duration of employment plus 3 years; if not hired, 3 years

2. Attendance Record

Retention Time

Year originated + 4

3. Commendations - All Files

Retention Time

Year originated + 4

4. Disability/Medical — DIP leave notices, etc.

Retention Time

Until released by Director, DM&HS

IX. Human Resources & Payroll/Benefits (Continued)

| | |
|---|--|
| 5. Disciplinary Action — Performance-related memos in employee personnel file | Retention Time 4 years unless union contract or plant policy (or labor agreement) on progressive discipline requires shorter retention |
| 6. Employment Contracts | Retention Time Duration of employment + 20 |
| 7. Memoranda Discussing Performance and Other Work-Related Issues | Retention Time Duration of employment |
| 8. Performance, Results Reviews or Appraisals — All copies | Retention Time Duration of employment + 3 |
| 9. Records Required Under Equal Pay Act for Hourly Workers — Regarding work week, hours, pay rates, total wages and deductions, collections, bargaining agreements | Retention Time 3 years |
| 10. Form 359's and Related Documentation | Retention Time Duration of employment + 3 |
| 11. Training Courses — Record all courses <ul style="list-style-type: none">• Non-safety-related courses• Safety-related courses | Retention Time Duration of employment + 3 Permanent |
| 12. Work History — In personnel file or retained elsewhere; bid sheets <ul style="list-style-type: none">• Company (original) copy in Personnel/Payroll file | Retention Time Until released by Director, DM&HS |

Personnel & Payroll

C. Payroll Records:

| | |
|---|---|
| 1. Authorization for Payroll Deductions — Other than tax <ul style="list-style-type: none">• Company copy in responsible office file | Retention Time Until 2 years after superseded |
|---|---|

IX. Human Resources & Payroll/Benefits (Continued)

| | |
|--|---|
| 2. Cancelled Payroll Checks & Check Registers <ul style="list-style-type: none">• Originals in file of responsible office | Retention Time Year originated + 3 |
| 3. Employee Tax Records Federal Income: <ul style="list-style-type: none">• W-4 form (original) in responsible office file• W-2 form (copy) in responsible office file• 1099 form (copy) in responsible office file State & Local Income or Earnings: <ul style="list-style-type: none">• All records in responsible office file | Retention Time Year originated + 6 and after tax audit Year originated + 6 and after tax audit Year originated + 6 and after tax audit Year originated + 6 and after tax audit unless longer retention required by statute and/or regulation |
| 4. Payroll Distribution Records Journal Entries: <ul style="list-style-type: none">• Company copy in division Accounting Department file• Other copies• Payroll Department work papers | Retention Time Until released by Director, DM&HS Year originated + 2, or less if no longer useful Year originated + 6 and after tax audit |
| 5. Tax Summary Reports <ul style="list-style-type: none">• Company copy in responsible Accounting Department file• Other copies | Retention Time Year originated + 6; audit by Tax Department before destroying Year originated + 2, or less if no longer useful |
| 6. Time Cards, Time Sheets, and Related Schedules <ul style="list-style-type: none">• Company copy in responsible office file | Retention Time Year originated + 3 |
| 7. Wage and Rate Schedules, Merit System <ul style="list-style-type: none">• Company copy of published or posted statements or schedules in issuing office file• Other copies | Retention Time Until 25 years after superseded Until superseded |

IX. Human Resources & Payroll/Benefits (Continued)

D. Policies & Procedures:

| 1. Employee Benefit Plans Other than Pension | Retention Time |
|--|--|
| • Legal background and opinions in Law Department file | Until 25 years after superseded |
| • Company copy of published plan documents in issuing office file | Until 25 years after termination of plan |
| • Other copies of published plan documents | Year originated + 1 |
| <hr/> | |
| 2. Personnel Policy Manual & Other Company Bulletins | Retention Time |
| • Company copy in Corporate Personnel Department file | Until 10 years after superseded |
| • Other copies | Until superseded |
| <hr/> | |
| 3. Pension Plans | Retention Time |
| • Legal background and opinions in Law Department and/or administering office file | Until 10 years after death of last beneficiary |
| • Company copy of published plan documents in issuing or administering office file | Until 10 years after death of last beneficiary |

F. Related Subject Files - All Personnel:

These files are maintained separately from the personnel file folder and are not available to the employee nor to anyone in management not directly involved in the proceeding without approval of the Law Department.

| 1. Documentation and/or Investigations of EEO-Related Matters — and other charges or legal proceedings | Retention Time |
|---|--|
| | Until 1 year after end of investigation |
| <hr/> | |
| 2. Salary and Wage Garnishments | Retention Time |
| | 1 year after satisfaction of garnishment |

IX. Human Resources & Payroll/Benefits (Continued)

G. Other:

| | |
|---|---|
| 1. Administrative Reports of Employment — Statistical or analytical <ul style="list-style-type: none">• Company copy of continuing statistics reports in Personnel/Payroll Department file | Retention Time Year originated + 50 |
| 2. Affirmative Action Plans and Supporting Documents — such as validation and results of selection procedures | Retention Time Year originated + 2 except for documents reflecting "adverse impact" of selection procedures, which should be kept for 2 years after cessation of adverse impact |
| 3. Applicant Lists of People Who Do Not Become Monsanto Employees — Records, lists | Retention Time Year originated + 1 |
| 4. Documents Reflecting Performance Issues of Temporaries | Retention Time 3 years after superseded |
| 5. Drug Testing Records <ul style="list-style-type: none">• For employee• For rejected offerees | Retention Time Duration of employment + 3 3 years |
| 6. Employee Lists — Skills inventory, addresses, memberships and applications, distribution, and other factual information (not employment or benefit record) <ul style="list-style-type: none">• All copies | Retention Time Until superseded |
| 7. I-9's and Other IRCA Documents <ul style="list-style-type: none">• All copies | Retention Time Until 3 years after hiring or 1 year after termination, whichever is longer |
| 8. Job Descriptions and Advertisements <ul style="list-style-type: none">• Company copy in issuing office file | Retention Time Until 1 year after superseded |
| 9. Labor Contracts — Work papers and negotiation records (See also "Contracts and Agreements") <ul style="list-style-type: none">• Company copy in Company or location file• Other copies | Retention Time Until 20 years after termination of the contract Same as above, or less if no longer useful |

IX. Human Resources & Payroll/Benefits (Continued)

| | |
|---|--|
| 10. Local Wage Bid Sheets — Seniority lists and other records of contract compliance (unless used as work history) | |
| <ul style="list-style-type: none">• Company copy in location file• Other copies | Retention Time Until 20 years after termination of the contract While useful only |
| <hr/> | |
| 11. Notices and Other Records Required by WARN Act | Retention Time 6 years |
| <hr/> | |
| 12. Records of Grievances and Arbitrations | Retention Time 50 years |
| <hr/> | |
| 13. Records Reflecting Architectural Compliance with ADA Requirements | Retention Time Until superseded |
| <hr/> | |
| 14. RIF Releases under OWBPA | Retention Time Duration of employment + 3 |
| <hr/> | |
| 15. Salary Increase Planning Sheets | Retention Time |
| <ul style="list-style-type: none">• Company copy in Payroll Accounting office• Other copies | Year originated + 1 While useful only |
| <hr/> | |
| 16. Time Cards or Time Sheets for Temporary Workers | Retention Time 2 years |
| <hr/> | |
| 17. Workmen's Compensation Claim Medical Files | Retention Time Duration of employment + 3, or at a later date when released by Director, DM&HS |

X. Legal

Pertaining to activities in which guidance or assistance of attorneys is generally required.

1. Antitrust Investigations—FTC & Department of Justice Retention Time

- | | |
|--|---|
| • All relevant and appropriate documents | Until termination of investigation and notice from Law Department |
|--|---|

2. Authorizations for Signatures to Documents Retention Time

- | | |
|--|------------------|
| • Company copy in administrating office file | Permanent |
| • Other copies | Until superseded |

3. Compliance Investigations — Federal, state, county, municipal & private Safety, Health and Environmental Practices, etc.:

Retention Time

- | | |
|---------------------------------------|---|
| • Company copy in Law Department file | Until termination of investigation and notice from Law Department |
| • Other copies | Until termination of investigation and notice from Law Department |

4. Contracts, Agreements & Related Records

Retention Time

See "Contracts & Agreements," page 16.

5. Documents Created to Comply With Export Trading Company Act

Retention Time

5 years

6. Incorporation, Acquisitions, Mergers, Consolidations, Reorganizations & Other Related Corporate Matters

Retention Time

See "Corporate Records," page 20.

7. Litigation & Claims

Retention Time

- | | |
|--|---|
| • Court files & work papers in Law Department file | Until completion of litigation and notice from the Law Department. <i>Except: Suits covered by insurance — permanent</i> |
| • Patent litigation in Patent Department file | Until termination of investigation and notice from Patent Law Department. <i>Except: Suits covered by Company insurance — permanent</i> |
-

X. Legal (Continued)

8. Monsanto Annual Compliance Certification (Policy on Business Conduct, Antitrust Laws, Political Activity and Conflict of Interest)

Retention Time

By Company Personnel:

- Company copy (signature copy of statement) & related records in files of responsible office
Year originated + 10
 - Other copies
Year originated + 1
-

9. Opinions & Other Records for Legal Guidance — Internal or external generation

Retention Time

- Company copy in Law, Patent or Treasury Department files
Year originated + 25, but if they are modified or replaced, then while useful only. Legal opinion given in connection with stock or asset acquisition or financing should be kept as long as the contracts pertaining to the transaction in question are kept
 - Other copies & excerpts
While useful only
-

10. Patent, Trademark & Copyright Matters

Retention Time

See "Patent, Trademark & Copyright," page 56.

11. Pending Claims - Year-end Report to Auditors

Retention Time

- Company copy in Law Department file
Year originated + 5
 - Other copies
Year originated + 1
-

12. Powers of Attorney

Retention Time

- Company copy in originating office file
Upon expiration + 10 or until expiration of retention period for patent file in question, whichever is later
 - Other copies
Upon expiration
-

13. Regulatory Agencies — Federal, state, county, municipal

Retention Time

Permits, Registrations, Petitions, Variances, Waivers, Orders, etc.:

- Company copy of applications and requests, supporting data used to complete applications, draft permits and orders, comments and correspondence provided to or by the regulatory agency and final copies in originating office and Environmental Law files
Permanent
 - Other drafts
Until completion of record
 - Other copies
While useful only
-

X. Legal (Continued)

**14. Settlements and Releases of Legal Claims
Signed in Advance of or During Litigation**

Retention Time
Permanent

15. Tax Matters

Retention Time
See "Tax," page 66.

XI. Manufacturing

A. Maintenance:

| | |
|--|-----------------------|
| 1. Maintenance Manuals & Instructions | Retention Time |
| • All copies | Until superseded |

| | |
|---|-----------------------|
| 2. Maintenance Records — For control of operations and cost, analysis of equipment performance, etc. | Retention Time |
| • All copies | Until purpose served |

B. Operations:

| | |
|--|-----------------------|
| 1. Manufacturing Data — Operating schedules, data logs and recordings, batch records, etc. — for control, operation analysis, patent purposes, etc. | Retention Time |
| • All copies | Until purpose served |

| | |
|--|-----------------------------------|
| 2. Materials Manufactured & Shipped Under Food & Drug Administration (or Other Agency) Control — Drugs, pharmaceuticals, cosmetic ingredients, feed additives, etc. | Retention Time |
| Necessary Manufacturing and Shipping Records: | |
| • Company copy in responsible office file | As specified by law or regulation |

| | |
|---|---|
| 3. Process or Facility Operating Manual — Description, flow charts, operating characteristics, instructions, and limits, as necessary to define process or operation | Retention Time |
| • Company copy in responsible office file (division, plant, CGE/AGE Technical Information Center or other) | Until 10 years after termination of product |
| • Other copies | Until superseded |

| | |
|--|-----------------------|
| 4. Process Technology — Technical data and information essential for supervision of manufacturing processes, but not included in process manual | Retention Time |
| • All copies | Until superseded |

| | |
|---|--|
| 5. Record of Alcohol Use — All required government reports | Retention Time |
| • Company copy in administering office for specific permit | Year originated + 5 or as specified by law or regulation |

| | |
|--|-------------------------|
| 6. Specifications — Products, raw materials, packaging & other supplies | Retention Time |
| • All copies | Until purpose is served |

XI. Manufacturing (Continued)

7. Testing/Analytical Procedures — Products, raw materials, supplies

Retention Time

Permanent if used in connection with an application or request for permits, registrations, petitions, variances, waivers, etc., draft permits and orders, comments and correspondence provided to or by a regulatory agency. Permanent if required by law to be submitted to the government, or if required by law to be retained by the Company to show compliance with federal regulations. Otherwise, until purpose served or as required by law

8. Test & Analysis Results — Products, raw materials, supplies

Retention Time

Permanent if used in connection with an application or request for permits, registrations, petitions, variances, waivers, etc., draft permits and orders, comments and correspondence provided to or by a regulatory agency. Permanent if required by law to be submitted to the government, or if required by law to be retained by the Company to show compliance with federal regulations. Otherwise, until purpose served or as required by law

C. Environmental Documents:

1. Data Collected to Demonstrate Compliance with Regulations — Federal, state, county, municipal

- All copies

Retention Time

Permanent if required by law to be submitted to the government, or if required by law to be retained by the Company to show compliance with federal regulations. Otherwise, until purpose served or as required by law

- Drafts and work papers

Until completion of report

2. Data Collected for Engineering Analysis, Engineering Design, etc.

- All copies

Retention Time

Permanent if supporting data for permit or application from government agency. Otherwise, until completion of project

3. Regulations, Procedures, Analytical & Sampling Methods

- All copies

Retention Time

Permanent if supporting data for a permit. Otherwise, until 10 years after superseded

XI. Manufacturing (Continued)

4. Test Data for Internal Company Control Purposes

- All copies

Retention Time

Until purpose served or until data superseded, whichever occurs first

D. Safety:

1. Safety Manuals & Instructions

- All copies

Retention Time

Until 10 years after superseded

2. Safe Handling Procedures

Retention Time

Until superseded

XII. Marketing

1. Advertising Copy

Retention Time

Proof or Sample:

- | | |
|--|----------------------|
| • Company copy in Marketing or other issuing office file | Year originated + 2 |
| • Log of advertisements in Marketing file | Year originated + 10 |

2. Advertising Research Projects, Market Research and Development Projects

Retention Time

Periodic Progress Reports:

- | | |
|---|-----------------------------|
| • Company copy in originating office file | Until completion of project |
| • Other copies | 2 months |

Interim, or Final, Summary Reports:

- | | |
|--|--|
| • Company and lending copies in originating office (or library) file | Year originated + 5 |
| • Information center file — microfilm | Permanent |
| • Other copies | 2 months |
| • Work papers and drafts | Until 1 year after completion of report, or less if no longer useful |
| • Corporate Report Index | Until superseded |

3. Call Reports

Retention Time

Year originated + 1, or if earlier, until superseded

4. Customer Complaint Records

Retention Time

- | | |
|--|---|
| • Complaints about products adjusted or resolved without litigation in division file | Year originated + 3 |
| • Complaints litigated, in all files | Until completion of case, and upon notice from Law Department |

5. Customer General Information File or List — Identity, addresses, personnel lists, financial status, material requirements, etc., of customers and prospects

Retention Time

- | | |
|-------------------------|------------------|
| • Copies in all offices | Until superseded |
|-------------------------|------------------|

6. Customer Payment Records — Marketing copy of balances & histories

Retention Time

Until superseded. See "Financial" Section, page 31.

7. Forecast or Strategies — Product, industry, market, customer, etc.

Retention Time

- | | |
|---|---|
| • Company copy and work papers in originating division file | Until 3 years after superseded |
| • Corporate Planning and Evaluation copy | Until 1 year after superseded |
| • Other copies | Until superseded, or less if no longer useful |
-

XII. Marketing (Continued)

| | |
|--|---|
| 8. Invoices, Shipping Papers, Debit & Credit Documents, Consignment Records, etc. | Retention Time Year originated + 3, or less if no longer useful |
| 9. Labels — Identifying Monsanto products as shipped to customers | Retention Time |
| • Company copy, all labels in Distribution Department | Permanent |
| • Company copy selected for trademark evidence in Distribution Department (or Patent Department) | Until termination of trademark |
| • Other copies | Until termination of label use |
| 10. List Price Deviation Record — Evidence of legality | Retention Time |
| • Company copy in issuing office file | Until 4 years after termination of contract |
| 11. Material Exchange Agreements & Contracts — See Chapter on Contracts, page 16. | Retention Time |
| • Other copies | Until termination of contract, or less if no longer useful |
| 12. Orders - Marketing — Copy of customer purchase orders and other order entry documents | Retention Time Year originated + 2, or less if no longer useful |
| 13. Price Sheets, Bulletins, or Lists | Retention Time |
| • Company copy in issuing office file | Until 5 years after superseded |
| • Other copies | Until superseded |
| • Statistical records of pricing | Until 2 years after termination of products |
| 14. Product Guarantees on Approved Monsanto Printed Forms | Retention Time |
| • Company (signature) copy in division files | Until 6 years after termination of guarantee |
| 15. Product Quality Specifications | Retention Time |
| • Company copy in division Manufacturing Department file | Until 10 years after superseded |
| • Marketing office copy | Until 1 year after superseded |
| • Other copies | Until superseded |
| 16. Shipping Product Specifications | Retention Time |
| • All copies | Until superseded |

XII. Marketing (Continued)

17. Sales Contracts & Agreements —

See also "Contracts & Agreements," page 16.

Retention Time

Sales Contracts on Approved Printed Monsanto Forms:

- | | |
|--|--|
| • Company (signature) copy in division files | Until 6 years after termination of contract |
| • Other copies | Until termination of contract, or less if no longer useful |
-

XIII. Patent, Trademark & Copyright

Pertaining to preservation of know-how and other industrial property rights.

1. Contracts & Agreements — Patents, know-how, secrecy, consultants, etc.

Retention Time

See "Contracts & Agreements," page 16.

2. File Histories

Retention Time

For life of patent, or less if no longer useful

3. Foreign Patent Application and Patent Files

- Issued patents
- Abandoned applications
- Lapsed patents

Retention Time

Until expiration, lapse or abandonment of patent, but only after review by Patent attorney

4. Patent Applications and Files (U.S.)

Retention Time

Issued Patents:

- Company copy in Patent Department file
- Other copies

For life of patent and after review by Patent attorney

For life of patent, or less if no longer useful

Abandoned Applications:

- Company copy in Patent Department file
 - If parent case
 - If not parent case
- Other copies

Same as last descendant

For 10 years after abandonment and after review by Patent attorney

For 2 years after abandonment

5. Patent Assignments and Powers of Attorney

Retention Time

Same as patent application or patent to which it relates

6. Patent Disclosures

Retention Time

If Patent Application Filed:

- Company copy in Patent Department file
- Other copies

For life of patent and after review by Patent attorney

For life of patent, or less if no longer useful

If No Patent Application Filed:

- Company copy in Patent Department file
- Other copies

Year originated + 15 and after Patent attorney review

Year originated + 2, or less if no longer useful

XIII. Patent, Trademark & Copyright (Continued)

| | |
|---|---|
| 7. Patent Studies & Searches (Including Opinions) | Retention Time |
| Company Copy in Patent Department File: | |
| • For novelty | Same as item 6, Patent Disclosure, above |
| • For infringement & validity | Until expiration of patent + 6 years, or less if no longer useful |
| • For state of the art | Completion of search + 10 |
| • Other copies — all searches | Year originated + 2, or less if no longer useful |
| 8. Submitted Ideas & Releases from Outside Inventors — Ideas & inventions from outside inventors | Retention Time |
| • Company copy in Patent Department file | Year originated + 25 |
| 9. Technology Pertinent to Patent Activity | Retention Time |
| • Processes, products, and other technical information in Patent Department file | Year originated + 25, or less if not useful |
| 10. Trademark & Copyright Registrations and Related Proceeding Records | Retention Time |
| • Company copy in Patent Department file | Until termination of registration |
| 11. Trademark, Evidential — Labels, invoice copies, etc., as required by Patent Department | Retention Time |
| • Company copy in originating office file or Patent Department file as arranged | Until termination of trademark |
| 12. Trademark Searches | Retention Time |
| • Company copy in Patent Department file | Until 5 years after completion of search, or less if no longer useful |

XIV. Planning Documents

1. Appropriation and Retirement Requests for Executive Committee and Board Action

| | Retention Time |
|---|---|
| • Copy of approved requests in Controller's Office file | Until 10 years after project |
| • Originating Company or Corporate Department copy and work papers of approved and unapproved requests | Until 10 years after completion of project, or less if no longer useful |
| • Corporate Plans Department copy, Patent Department copy and work papers of approved and unapproved requests | Year originated + 10, or less if no longer useful |
| • Board of Director and Executive Committee individual copy | While useful only |
| • Other copies of approved and unapproved requests | Year originated + 1, or less if no longer useful |

2. Appropriation and Retirement Requests at Unit Vice President Level or Below

| | Retention Time |
|---|--|
| • Company copy in originating division file | Until 5 years after completion of project |
| • Other copies | Year originated + 1, or less if no longer useful |

3. Business Direction Papers - Including Supply Direction Papers, Staff Function Direction Papers, World Area Direction Papers

| | Retention Time |
|--|---|
| • Originating office and Corporate Plans Department copies | Year originated + 10, or less if no longer useful |

4. Forecasts - Sales, Market, Economic, etc.

| | Retention Time |
|---|---|
| • Copy in originating or sponsoring office file | Until 5 years after superseded |
| • Other copies | Until superseded, or less if no longer useful |

5. Job Results Analysis/Goals Documents

| Retention Time |
|-----------------------|
| Year originated + 1 |

6. Long Range Plans

| | Retention Time |
|---|--------------------------------|
| • Originating company or staff department copy, work papers and related files | Until 5 years after superseded |

7. Summary Long Range Plan

| | Retention Time |
|---|---|
| • Corporate Plans Department copy, and related files of summaries and evaluations | Year originated + 25, or less if no longer useful |
| • Other copies, including summaries and evaluations | Until superseded, or less if no longer useful |

8. Strategies - Product, Industry, Market Customer, etc.

| | Retention Time |
|---|---|
| • Company copy and work papers in originating division file | Until 5 years after superseded |
| • Corporate Plans Department copy | Until 1 year after superseded |
| • Other copies | Until superseded, or less if no longer useful |

XV. Purchasing

1. Purchase Orders — Including requisitions, supplier acknowledgements and other essential related papers

- Originating purchasing office file copy
- Engineering, maintenance storeroom, supply department or other requisitioning and receiving office file
- Research copy if required to substantiate, validate or supplement experimental record

Retention Time

Until 1 year after termination of contract

Until termination of service, material or equipment purchased, or less if no longer useful

Year originated + 25, or permanent if on microfilm

2. Purchase Requisitions

- Company copy in Purchasing Department file
- Other copies

Retention Time

Same as purchase order, or less if no longer useful

Until completion of purchase

3. Purchasing Statistics

- Monthly and quarterly — Company copy in Central Purchasing file
- Annual — Company copy in Central Purchasing file
- Other Copies

Retention Time

Year originated + 1

Year originated + 10, or less if no longer useful

Year originated + 1, or less if no longer useful

4. Shipping Requirements, Technical and/or Commercial Information — Pertinent to purchasing

Retention Time

Until superseded, or less if no longer useful

5. Vendor Lists — Information, catalogs, etc.

Retention Time

Until superseded

XVI. Real Estate

1. Abstracts of Title

- Original
- Other copies, if any

Retention Time

Normally delivered to buyer at closing
Until 10 years after termination of ownership

2. Deeds — Title opinions and related documents

- Company copy in Treasury Department or designated file
- Other copies

Retention Time

Until 10 years after termination of ownership

Until termination of ownership, or less if no longer useful

3. Employee Housing Activity Records

- Company copy in Corporate Personnel or Relocation Office file
- Other copies

Retention Time

Until 3 years after termination of activity and completion of tax audit
Until termination of activity

4. Leases

- Company copy in Treasury Department in designated file
- Other copies

Retention Time

Until 10 years after termination of lease

Until termination of leases, or less if no longer useful

5. Title Insurance Policies/Opinions

Retention Time

Permanent

XVII. Risk Management And Insurance

(Previously "Insurance" Chapter)

| | |
|---|-----------------------|
| 1. Insurance Policies - Work and Related Papers | Retention Time |
| • Company copy in Risk Management Department file | Permanent |
| • Documents reflecting all other insurance coverage issues, limits of liability, and aggregate impairment | Permanent |

| | |
|--|-----------------------|
| 2. Annual Insurance Policy Schedule/ Insurance Policy Listing | Retention Time |
| • Company copy in Risk Management Department file | Permanent |
| • Other copies & excerpts | While useful only |

| | |
|---|--------------------------------------|
| 3. Insurance Claim Files — (Other than Workmen's Compensation) | Retention Time |
| • Company copy in Risk Management Department file | Permanent |
| • Other copies | 10 years beyond termination of claim |

| | |
|---|-----------------------|
| 4. Insurance Claim & Reimbursement Request Files | Retention Time |
| • Company copy in Risk Management Department file | Permanent |

| | |
|--|-------------------------------------|
| 5. Workmen's Compensation Claim Files | Retention Time |
| | 7 years beyond termination of claim |

| | |
|--|-----------------------|
| 6. Insurance Certificates Furnished by Contractors Working on Monsanto's Premises | Retention Time |
| | Permanent |

| | |
|---|--|
| 7. Correspondence Regarding Litigation | Retention Time |
| • Ongoing litigation correspondence | In accordance with Law Department instructions |

XVIII. Scientific And Technical

Records & Indexes:

| | |
|---|---|
| 1. Experimental Project Planning — Recording inception, intent, continuity and relationship of experimental and developmental projects — minutes, plans, memos, etc. | Retention Time |
| • Company copy in originating office file if not in notebook record | Year originated + 20 |
| • Other copies | Year originated + 1, or less if no longer useful |
| <hr/> | |
| 2. Experimental Project Reports — All labs, pilot plants and other experimental facilities — periodic progress reports | Retention Time |
| • Originating office copy | Until interim or final report |
| • Company copy, all reports, in Information Center file | Permanent |
| • Patent Department copy | Year originated + 25, or less if no longer useful |
| • Division and/or local library or Technical Information Center copy report | Until interim or final |
| • Other copies | 2 months |
| <hr/> | |
| 3. Evidential Record — Essential to substantiate, validate, or supplement experimental records (e.g., notebook entries), material specifications, drawings, calculations, analysis and test data minutes, correspondence, affidavits, etc. | Retention Time |
| • Original or validated copy, in or maintained with notebooks to every extent possible | Year originated + 25; microfilm before destroying |
| • Microfilm copy in same reel with pertinent notebook | Permanent |
| <hr/> | |
| 4. Experimental Samples — Pertaining to preparation, identification, analysis, testing, evaluation, distribution, etc. | Retention Time |
| • New material — chemicals, products, assemblies, prototypes, etc. | Year originated + 25; microfilm before destroying |
| • Improved products — initial preparation in lab, pilot plant and plant | Year originated + 25; microfilm before destroying |
| • New processes — initial product from lab, pilot plant and plant | Year originated + 25; microfilm before destroying |
| • Materials supplied — to customers, government, or other outside party for testing and evaluation | Year originated + 25; microfilm before destroying |
| • Materials received — from outside for testing or evaluation | Year originated + 25; microfilm before destroying |
| • Microfilms of the above | Permanent |

XVIII. Scientific And Technical (Continued)

| | |
|--|---|
| 5. Experimental Work — All original records of scientific or technical experimentation or investigation, whether as bound notebooks, log books, data sheets, etc. | Retention Time |
| <ul style="list-style-type: none">• Original — In research laboratory, research office, or designated repository (an exception to this manual may be made for records having historical or archival value) | Year originated + 25; microfilm before destroying |
| <ul style="list-style-type: none">• Microfilm — Company copy from all Monsanto Company and subsidiary labs, in Information Center file, local copy in lab or library file | Permanent |

| | |
|---|--|
| 6. Interim or Final Reports, Tentative Process, Literature Survey, Special, Product and Summary Reports | Retention Time |
| <ul style="list-style-type: none">• Originating office copy, work papers and drafts | Year originated + 1 |
| <ul style="list-style-type: none">• Company and circulating copy, all reports, in Information Center file | Original copy for year originated + 35; permanent on microfilm |
| <ul style="list-style-type: none">• Division and/or local library or Information Center file | Original copy for year originated + 35; permanent on microfilm |
| <ul style="list-style-type: none">• Other copies | 2 months |

| | |
|--|--|
| 7. Label Registration — Data and information for product application, etc., assembled for regulatory agency activities, technical support, etc. | Retention Time |
| <ul style="list-style-type: none">• Research Department file copy | Until 5 years after product discontinued |
| <ul style="list-style-type: none">• Product Development file copy | Until 5 years after product discontinued |

| | |
|---|--|
| 8. Pilot Plant Scale Work — All original records of scientific or technical experimentation or investigation, such as log books, data sheets, etc. (bound notebooks should be treated as #3 above) | Retention Time |
| | Year originated + 10 or less if purpose served; review before destroying |

| | |
|--|-----------------------|
| 9. Sample Recording Control (SRC) — Physical-chemical data of new research materials | Retention Time |
| <ul style="list-style-type: none">• Original copy of sample announcement and updating or extending information in Research Information Center file | Year originated + 35 |
| <ul style="list-style-type: none">• Microfilm in Research Information Center file | Permanent |
| <ul style="list-style-type: none">• Microfilm in other libraries and Information Center | Year originated + 50 |

XIX. Shipping And Transportation

1. Bills of Lading

- Company copy (domestic) in responsible office file
- Company copy (export) in responsible office file
- Other (domestic or export) copies

Retention Time

Year originated + 6 and after tax audit
Year originated + 6 and after tax audit
Year originated + 6, or less if no longer useful

2. Claims For Damage — To shipments, to property and monetary

- Original claim card
- Company copy in Distribution Department file
- Other copies

Retention Time

Year originated + 6 and after tax audit
Until 3 years after completion of settlement
Until completion of settlement

3. Claims, Freight Charges - Over/Under Charges Under Legal Tariffs

- Original claim card
- Company copy in Distribution Department file
- Other copies

Retention Time

Current year + 6 and after tax audit
Until 3 years after completion of settlement
Until completion of settlement

4. Controlled Materials — Manufactured and shipped under government agency control

- Company copy of shipping record in responsible office file

Retention Time

As specified by law or regulation

5. Duty Drawback Claim — Records concerning manufacture, sale, shipping of material from duty-paid raw materials

- Company copy in administrating office

Retention Time

Until 3 years after claim payment

6. Export Control Documents, Memoranda, Correspondences, Invitations to Bid, Book of Account, Restricted Trade or Boycott Documents

Retention Time

5 years

7. Freight Payment

- Company copy in Accounts Payable voucher file
- Other copies

Retention Time

Year originated + 6 and after tax audit
Year originated + 3, or less if no longer useful

8. Leases — Shipping, storing and transportation equipment — cars, trucks, barges, ships, containers, tanks, warehouses, tracks, etc.

- Company copy in Distribution Department File
- Law Department copy

Retention Time

Until 6 years after termination of lease*
Until 6 years after termination of lease, or less if no longer useful*

*Note: See, however, item 12 under the "Contracts & Agreements" chapter, page 19.

XIX. Shipping And Transportation (Continued)

| | |
|---|---|
| 9. Operating Authorities — From federal, state, county and municipal agencies | Retention Time |
| • Company copy in Distribution Department File | Until 3 years after authority expires |
| • Other copies | Until authority expires |
| 10. Rate-Route, Classification Negotiations — For establishment or adjustment — federal, state, county, municipal — of freight movements | Retention Time |
| • Company copy in Distribution Department File | Until 6 years after termination of movement |
| • Other copies | Until termination of movement, or less if no longer useful |
| 11. Rate-Route File — Cards, master files, etc. | Retention Time |
| • Company copy in Distribution Department File | Until 3 years after superseded |
| • Other copies | Until superseded, or less if no longer useful |
| 12. Receiving Reports | Retention Time |
| • Company copy in Accounts Payable voucher file | Year originated + 6 and after tax audit |
| • Other copies | Year originated + 2, or less if no longer useful |
| 13. Shipping Notices | Retention Time |
| • Company copy in Billing Department file | Year originated + 2 |
| • Other copies | Year originated + 2, or less if no longer useful |
| 14. Statutes and Regulations Governing Transportation, Also Opinions and Other Records of Guidance | Retention Time |
| • Company copy in Distribution Department file | Until 6 years after superseded |
| • Other copies | Until superseded, or less if no longer useful |
| 15. Tariff Schedules — Interstate, state and municipal | Retention Time |
| • Company copy in Distribution Department file | Until 3 years after superseded |
| • Other copies | Until superseded, or less if no longer useful |
| 16. Technical Data — Specifications and other information concerning products and raw materials — pertinent to distribution | Retention Time |
| • Distribution Department or other responsible group file | Until superseded |
| 17. Transportation Equipment and Facility Records — Specifications, drawings, technical data, etc. — owned or leased equipment | Retention Time |
| • Company copy in Distribution Department file | Until 6 years after termination of equipment |
| • Other copies | Until termination of equipment, or less if no longer useful |

XX. Tax

| | |
|---|--|
| 1. Disqualifying Stock Disposition Cards <ul style="list-style-type: none">• Company copy in Tax Department file | Retention Time Year originated + 5 and after tax audit |
| 2. Federal/Corporate Income Tax — Copies of returns, agent reports, waivers of statute of limitations, work papers, etc. <ul style="list-style-type: none">• Company copy in Tax Department file• Other copies | Retention Time Year originated + 100 While useful only |
| 3. Federal Lubricating Certificates <ul style="list-style-type: none">• Company copy in Tax Department file | Retention Time Until terminated or superseded + 5 |
| 4. Federal Personal Income Tax Records — On Forms W-2, W-4, 1099 & related records | Retention Time Year originated + 6 and after tax audit |
| 5. Federal & State Gasoline, Motor Fuel & Lubricating Oils Tax Returns <ul style="list-style-type: none">• Company copy in Tax Department or other originating office file | Retention Time Year originated + 6 |
| 6. Federal Unemployment Tax Return <ul style="list-style-type: none">• Company copy in Tax Department file | Retention Time Year originated + 10 |
| 7. FICA (Social Security) Records <ul style="list-style-type: none">• Company copy in Tax Department file<ul style="list-style-type: none">• Detail• Return | Retention Time Year originated + 20 Year originated + 50 |
| 8. Inspection Fee Returns <ul style="list-style-type: none">• Company copy in Tax Department file | Retention Time Year originated + 6 |
| 9. Real Estate & Personal Property Tax <ul style="list-style-type: none">• Company copy in Tax Department file<ul style="list-style-type: none">• Returns• Valuation data• Tax receipts• Other copies | Retention Time Year originated + 35 Year originated + 35 Year originated + 35 While useful only |

XX. Tax (Continued)

| | |
|--|--|
| 10. Sales & Use Tax Records | Retention Time |
| <ul style="list-style-type: none">• Company copy in Tax Department file<ul style="list-style-type: none">• Returns• Tabulations• Exemption Certificates• Other copies | <ul style="list-style-type: none">Year originated + 25Year originated + 6Expiration of exemption + 5 yearsWhile useful only |
| 11. State & Local Personal Income or Earnings Tax Records | Retention Time Year originated + 6 |
| 12. State Income & Franchise Tax Records — Returns & work papers | Retention Time |
| <ul style="list-style-type: none">• Company copy in Tax Department file• Other copies | <ul style="list-style-type: none">Year originated + 30While useful only |
| 13. State Oil & Gas Production & Severance Tax Returns | Retention Time |
| <ul style="list-style-type: none">• Company copy in Tax Department or other originating office file | <ul style="list-style-type: none">Year originated + 25 |
| 14. State Unemployment Tax Return | Retention Time |
| <ul style="list-style-type: none">• Company copy in Tax Department file | <ul style="list-style-type: none">Year originated + 50 |
| 15. Tax Opinions, Studies, Etc. — For acquisitions, mergers, employee benefit programs, pensions, etc. | Retention Time |
| <ul style="list-style-type: none">• Company copy in Tax Department file• Other copies & excerpts | <ul style="list-style-type: none">25 years from date of issuanceWhile useful only |
| 16. Tax Rulings & Opinions | Retention Time |
| <ul style="list-style-type: none">• Company copy in Tax Department file• Other copies & excerpts | <ul style="list-style-type: none">Date of issue + 25While useful only |

XXI. Sample Certification Of Compliance Letter

Monsanto

From: (Name-Location-Phone)

Date:

Subject: **RECORDS MANAGEMENT**

Reference:

To: _____, Corporate Secretary

This is to confirm that all _____ Company/Department files have been reviewed and are in compliance with the Corporate Records Management Manual.

Unit Vice President, Corporate Staff Department
Director or applicable EMC Member

XXI. Sample Request For Exception Letter

Monsanto

From: (Name-Location-Phone)

Date:

Subject: **RECORDS MANAGEMENT**

Reference:

To: _____, Corporate Secretary

The following exceptions to the Corporate Records Management Policy are requested:

Department Requesting Exception:

Description of Record(s):

Justification for Exception:

Unit Vice President, Corporate Staff Department
or applicable EMC Member

Index

-A-

| | |
|--|--------------|
| Abandoned Application - Patent | 56 |
| Abandoned Negotiations - Contracts | 17 |
| Abandoned Projects | 23 |
| Abstracts of Title | 60 |
| Accounting & Budget Procedures | 39 |
| Accounting Directives | 39 |
| Accounting Related Data Processing | 14 |
| Accounting Miscellaneous | 39 |
| Accounts Payable | 31 |
| Accounts Receivable | 32 |
| Acquisitions - Corporate Records | 20 |
| Actual vs. Budget Financial Reviews | 35 |
| Actual vs. Budget Reports for Expenses | 35 |
| Administrative | 10 |
| Administrative Reports | 10 |
| Administrative Reports of Employment | 45 |
| Advertising Communications | 53 |
| Advertising Copy | 53 |
| Advertising Research | 53 |
| Affirmative Action Plans and Supporting Documents | 45 |
| After Microfilming - Definition | 8 |
| After Review - Definition | 8 |
| Alcohol — Use of | 50 |
| Analytical & Sampling Methods | 51 |
| Annual Compliance Certification | 5, 9, 48, 68 |
| Annual Reports | 11, 22 |
| Applicant Lists of People Who Do Not Become Employees | 45 |
| Application, Employment | 41 |
| Appropriation & Retirement Requests | 36, 58 |
| Appropriation & Retirement Requests, Planning Documents | 58 |
| Archives | 6 |
| Attendance Records, Employee | 41 |
| Automatic Continuous Area Monitoring Data | 30 |
| Audit | 33 |
| Audits, DM&HS | 28 |
| Authorization for Expenditures | 40 |
| Authorization for Payroll Deductions | 42 |
| Authorization for Signatures (Environmental) | 27 |
| Authorization for Signatures Other than Environmental | 47 |
| Awarded Contract | 26 |

-B-

| | |
|--|--------|
| Bank Account Statements & Reconciliations | 33 |
| Bank Resolutions | 33 |
| Bank Statements of Condition | 34 |
| Banking | 33 |
| Benefit Records | 41 |
| Bid Sheets | 46 |
| Billing | 34 |
| Bills of Lading | 17 |
| Bills of Lading, Shipping & Transportation | 64 |
| Board of Directors Minutes | 20, 21 |
| Bound Notebooks, Scientific & Technical | 62 |

| | |
|---------------------------|----|
| Budget | 35 |
| Budget Documents, All | 35 |
| Business Direction Papers | 58 |

-C-

| | |
|--|--------------|
| Call Reports | 53 |
| Cancelled Checks & Check Registers | 34 |
| Cancelled Payroll Checks & Check Registers | 43 |
| Cancelled Stock Certificates | 21 |
| Capital Addition & Replacement | 37 |
| Capital Expenditure & Property Records | 36 |
| Cash Receipt Documents | 32 |
| Cash Receipts Ledger | 32 |
| CEAs | 23 |
| CGE/AGE Project Files | 24 |
| CGE/AGE Project Support Files | 24 |
| Certificate of Compliance | 5, 9, 48, 68 |
| Certificates of Incorporation | 20 |
| Chronological Files and Reading Files | 12 |
| Claim Files | 61 |
| Claims for Damage, Shipping & Transportation | 64 |
| Claims, Freight Charges, Shipping & Transportation | 64 |
| Commendation, Letters to File | 41 |
| Communications | 12 |
| Company Bulletins - Personnel | 44 |
| Company Confidential Know-How | 16, 56 |
| Company Ledger | 38 |
| Completion — Definition | 8 |
| Compliance Investigations | 47 |
| Compliance Letter, Records Mgt. | 5, 9, 48, 68 |
| Computers & Data Processing | 14 |
| Computer Print-Outs | 15 |
| Consigned Stock | 34, 54 |
| Consolidations — Corporate Records | 20 |
| Construction — Enviro-Chem | 25 |
| • Daily Report | 25 |
| • Local Craft Labor Agreement | 25 |
| • Progress Photos | 25 |
| Construction Expense Data | 36 |
| Contracts | 16 |
| Contract for Sale or Licensing of Patents or Know-How | 56 |
| Contract for Acquisitions | 20 |
| Contracts & Agreements | 16 |
| Contracts Individually Prepared | 17 |
| Contract — Supporting Papers & Correspondence | 17 |
| Controlled Materials, Shipping & Transportation | 64 |
| Conversion Agreements | 18 |
| Copyright Matters | 57 |
| Core Memories | 14 |
| Corporate Guide | 20 |
| Corporate Records | 20 |
| Corporate Secretary's Records | 20 |
| Correspondence | 12 |
| Cost | 39 |

Index (Continued)

| | |
|---|--------|
| Cost & Service Reports | 39 |
| Cost Standards | 39 |
| Customer Complaint Records | 53 |
| Customer General Information | 53 |
| Customer History Records | 32, 53 |
| Customer Invoices, Shipping Papers, Debit & Credit Documents, Consignment Records | 54 |
| Customer Payment Records | 53 |
| Customer Purchase Orders | 54 |
| Customer Strategies | 53, 58 |

-D-

| | |
|---|------------|
| Daily Activity Reports, Accounting | 31 |
| Daily Control Statements, Accounting | 31 |
| Data 1099 | 31, 43, 66 |
| Data for Engineering Analysis, Design | 51 |
| Data — Plant Monitored | 30 |
| Data Processing | 14 |
| Debit & Credit Source Documents | 34 |
| Deeds — Real Estate | 60 |
| Definitions | 8, 9 |
| Demonstrate Compliance — Federal, State, County | 51 |
| Depository Receipts | 34 |
| Design — Enviro-Chem | 26 |
| Design Date — Enviro-Chem | 26 |
| Design Summaries — Enviro-Chem | 26 |
| Directives & Manuals; Accounting | 39 |
| Disability/Medical | 41 |
| Disciplinary Action, Letters to File | 42 |
| Disqualifying Stock Disposition Cards, Tax | 66 |
| Dissolutions — Corporate Records | 20 |
| Distribution Reports | 31 |
| DM&HS | 27 |
| Document Indexes | 6 |
| Drawings | 23 |
| Drawings, Bills of Materials, Specifications | 26 |
| Drug Testing Records (Employees) | 45 |
| Duty Drawback Claim, Shipping & Transportation | 64 |

-E-

| | |
|---|------------|
| EAs | 23 |
| Earnings Tax Records | 67 |
| EDP Programs | 15 |
| EEO-Related Matters | 44 |
| Electronic Documents — General | 14, 15 |
| Electronic Mail Documents | 15 |
| Employee Benefit Plans — Other Than Pension | 44 |
| Employee Housing Activity Reports | 60 |
| Employee Lists | 45 |
| Employee Medical Records | 29, 41 |
| Employee Tax Records | 43, 66, 67 |
| Employee X-Rays | 29 |
| Employees Not Vested | 41 |
| Employees with Vested Interest | 41 |
| Employment Administrative Reports | 45 |
| Employment Application, Not Hired | 45 |
| Employment Contracts | 18, 42 |

| | |
|---|--------|
| Employment Contracts & Agreements | 18, 42 |
| Employment Records | 41 |
| Engineering | 23 |
| Engineering Data — Analysis & Design | 24 |
| Engineering Documents - Enviro-Chem | 26 |
| • Correspondence Relating to Design | 26 |
| • Design Date & Calculation | 26 |
| • Design Summaries | 26 |
| • Drawings, Bills of Materials, Specifications | 26 |
| • Foreign Drawings | 26 |
| Environmental Assessments, DM&HS | 28 |
| Environmental Control Data, Engineering | 24 |
| Engineering Technical Information | 24 |
| Engineering Technical Reports | 24 |
| Enviro-Chem | 25 |
| Environmental, Safety & Health | 27 |
| Environmental, Safety & Health Records | 27 |
| • Authorization to Sign Documents | 27 |
| • Company Guidance & Procedures | 27 |
| • Government Contacts | 27 |
| • Hazardous Waste Shipping Manifests | 27 |
| • Regulatory Agency Reports Federal, state, local | 27 |
| • OSHA Material Safety Data Sheets | 27 |
| • Surveys & Audits | 28 |
| Equal Pay Records | 42 |
| Evidence of Legality — Price Deviation | 54 |
| Evidential Record, Scientific and Technical | 62 |
| Expense Reports | 40 |
| Experimental Project Planning | 62 |
| Experimental Project Reports | 28, 62 |
| Experimental Samples, Scientific & Technical | 62 |
| Experimental Work | 62 |
| Export Control Documents | 64 |
| Export Trading Company Act Documents | 47 |
| External Audit Reports | 33 |
| External Communications | 11 |

-F-

| | |
|--|----|
| Facility Engineering Drawings | 23 |
| Federal Corporate Income | 66 |
| Federal Personal Income Tax | 66 |
| Federal Lubricating Certificates | 66 |
| FICA Tax | 66 |
| File Histories, Patent | 56 |
| Files, Desks, Credenzas and Bookshelves — Compliance | 9 |
| Financial | 31 |
| Financial Assurance Statements (Environmental) | 27 |
| Financial Statements | 38 |
| Financial Statements - Foreign Subsidiaries | 38 |
| Financial Status Reports | 32 |
| Forecast or Strategies, Marketing | 53 |
| Forecasts, Planning Documents | 58 |
| Foreign Drawings | 26 |
| Foreign Patent | 56 |
| Form 359 | 42 |
| Forms — General Business | 12 |

Index (Continued)

| | |
|--|----|
| Freight Bills | 31 |
| Freight Payment, Shipping & Transportation | 64 |
| FTC & Department of Justice | 47 |

-G-

| | |
|---|--------|
| Gasoline, Motor Fuel & Lubricating | |
| Oils Tax Return | 66 |
| General Ledger | 15, 38 |
| General Ledgers — of All Operating Company & Staff Departments | 38 |
| General Records: Acquisitions/Mergers/ Consolidations/Reorganizations/Dissolutions/Joint Ventures | 20 |
| Goals Documents | 58 |
| Government Contacts - Environmental | 27 |
| Government (U.S.) Contracts | 18 |
| Grievances & Arbitrations | 46 |

-H-

| | |
|------------------------------------|----|
| Hazardous Waste Shipping Manifests | 27 |
| Historical Items | 6 |
| "Hold Confidential" | 16 |

-I-

| | |
|---|------------|
| I-9 and Other IRCA Documents | 45 |
| Improved Products — Initial Preparation in Lab, Pilot Plant and Plant | 62 |
| Indexes to Documents | 6 |
| Individual Authorizations for Expenditures | 40 |
| Industrial Hygiene | 28 |
| • Correspondence | 28 |
| • Drafts | 28 |
| • Experimental Project Reports | 28 |
| • LP & EC Reports | 28 |
| • LP & EC Procedures and Checklists | 28 |
| Industry Strategies | 58 |
| Inspection Fee Returns | 66 |
| Insurance (See Risk Management) | 61 |
| Insurance Annual Schedule/Listing | 61 |
| Insurance Claims | 61 |
| Interim or Final Reports — Scientific & Technical | 63 |
| Internal Audit Reports | 33 |
| Internal Communications: Generated Inside | |
| Monsanto for Internal Use | 12 |
| Investigations, Antitrust | 47 |
| Invoices | 31 |
| Invoices, Debits & Credits | 34 |
| Invoices, Shipping Papers, Debit & Credit Documents, Consignment Records | 34, 35 |
| IRS 1099 Data | 31, 43, 66 |
| Issued Patents | 56 |

-J-

| | |
|---|----|
| Job Descriptions & Advertisements | 45 |
| Job Results Analysis | 58 |
| Job Results Analysis/Goals Documents, Planning Documents | 58 |

| | |
|--|----|
| Joint Ventures, etc. - Corporate Records | 20 |
| Journal Entries, Payroll | 43 |
| Journal Entries | 33 |

-K-

| | |
|---------------------|----|
| "Keep Confidential" | 12 |
|---------------------|----|

-L-

| | |
|---|--------|
| Label Registration | 63 |
| Labels | 54 |
| Labor Contracts | 18 |
| Labor Contracts, Personnel & Payroll | 45 |
| Leases - Real Estate | 60 |
| Leases (Excluding Real Estate) | 18 |
| Leases — Shipping, Storing and Transportation Equipment | 64 |
| Ledgers (See also Company Ledgers & General Ledgers) — Materials and Goods | 39 |
| Legal | 47 |
| Legal Opinions and Guidance | 48 |
| Library Materials | 6 |
| Licenses, Permits, Registrations | 28, 48 |
| List Price Deviation Record | 54 |
| Literature Survey | 63 |
| Litigation & Claims | 47 |
| Local Craft Labor Agreement (Enviro-Chem) | 25 |
| Local Wage Bid Sheet | 46 |
| Long Range Plans | 58 |
| Lost Stock Certificates | 21 |
| LP & EC Reports, DM&HS | 28 |

-M-

| | |
|--|--------|
| Machine Sensible Form — Computers | 14 |
| Machine Sensible Form — Data Processing | 14 |
| Magnetic Data | 14 |
| Maintenance | 50 |
| Maintenance Manuals & Instructions | 50 |
| Maintenance Records | 50 |
| Major Contract — Definition | 16 |
| Major Contracts Retention Period | 17, 19 |
| Manuals — Accounting and Audit | 39 |
| Manuals — Administrative | 10 |
| Manuals — Engineering | 23 |
| Manuals — Enviro-Chem | 26 |
| Manuals — Maintenance | 50 |
| Manuals — Personnel Policy | 44 |
| Manuals — Process or Facility Operations | 50 |
| Manuals — Safety | 10 |
| Manufacturing | 50 |
| • Environmental Documents | 51 |
| Compliance Data | 51 |
| Engineering Analysis/Design Data | 51 |
| Regulations, Procedures | 51 |
| Analytical & Sampling Methods | 51 |
| Test Data for Internal Control | 52 |
| • Maintenance Manuals | 50 |

Index (Continued)

| | |
|--|--------|
| • Maintenance Manuals | 50 |
| • Maintenance Records | 50 |
| • Manufacturing Data | 50 |
| • Materials Manufactured and Shipped Under FDA, EPA or other Agency Control | 50 |
| • Process or Facility Operating Manual | 50 |
| • Process Technology | 50 |
| • Record of Alcohol Use | 50 |
| • Safety Manuals | 52 |
| • Specifications | 50 |
| • Testing/Analytical Procedures | 51 |
| • Test & Analysis Results | 51 |
| Manufacturing Data | 50 |
| Market Research | 53 |
| Market Strategies | 53, 58 |
| Marketing | 53 |
| Master Property List | 15, 37 |
| Material and Equipment Status Report | 26 |
| Material Exchange Agreements/Conversions | 18 |
| Material Exchange Agreements & Contracts, Marketing | 54 |
| Materials Manufactured & Shipped Under FDA, EPA or Other Agency Control | 50 |
| Medical | 29 |
| • Employee Medical History | 29 |
| • Locations Utilizing Retained Medical Facilities | 29 |
| • Employee X-Rays | 29 |
| • Narcotic Records | 29 |
| Medical Records | 29 |
| Medical Benefit Records, Employee Plans | 41 |
| Memberships | 45 |
| Mergers — Corporate Records | 20 |
| Minor Contracts | 17, 19 |
| Minor Contracts, Not Retained by Office of Corporate Secretary | 17 |
| Minutes — Stockholders & Directors Meetings | 21 |
| Minutes — Corporate Records | 20, 21 |
| Monitored Data (DM&HS) | 30 |

-N-

| | |
|---|----|
| Narcotic Records | 29 |
| Negotiation Records, Personnel & Payroll | 45 |
| New Material — Chemicals, Products, Assemblies, Prototypes; Scientific and Technical | 62 |
| Non-Accounting Related Data Processing | 14 |
| Non-Awarded Contract | 26 |

-O-

| | |
|---|--------|
| Obsolete Disks and Workstations | 15 |
| Off-Site Records | 6 |
| Office of the Corporate Secretary | 5, 20 |
| Oil & Gas Lease Transaction Records | 36 |
| Operating Authorities — from Federal, State, County and Municipal Agencies | 65 |
| Operating/Maintenance Manuals | 50 |
| Operations | 50 |
| Opinions, Legal Guidance | 27, 48 |

| | |
|----------------------------------|--------|
| Optical Disks | 14 |
| Order Entry Documents | 54 |
| OSHA — Individual Records | 30 |
| OSHA Material Safety Data Sheets | 27, 30 |
| Outside Inventors | 57 |

-P-

| | |
|---|-------|
| Payroll Distribution Records | 43 |
| Payroll Records | 42 |
| Past Products & Business | 6 |
| Patents | 56 |
| Patent, Trademark & Copyright Matters | 56 |
| Patent, Trademark & Copyright • File Histories | 56 |
| Patent Applications (Foreign & Domestic) | 56 |
| Patent Assignments | 56 |
| Patent Disclosures | 56 |
| Patent Studies & Searches | 57 |
| Payment Reports | 31 |
| Pending Claims (Litigation) | 48 |
| Pension Plans | 44 |
| Performance Review/Reports | 42 |
| Permanent — Definition | 9 |
| Permission to Deviate from Records Manual | 6, 69 |
| Personal Protection Equipment Selection Requirements | 30 |
| Personnel & Payroll (See "Human Resources") | 41 |
| Personnel Policy Manual | 44 |
| Petitions, Other Environmental Filings | 28 |
| Photographs | 13 |
| Photographs as Evidence | 13 |
| Photographs for Advertising | 13 |
| Photographs for Engineering Design | 13 |
| Photographs for Enviro-Chem | 25 |
| Photographs for Publicity | 13 |
| Photographs, VideoTapes & Film | 13 |
| Pilot Plant Scale Work | 63 |
| Planning Documents | 58 |
| Plant Facilities — Actual vs. Capacity Reports | 36 |
| Plant Monitored Data | 30 |
| Policies, Insurance | 61 |
| Policies & Procedures - Employee Benefit Plans | 44 |
| Policy, Administrative | 10 |
| Pollution Documents (Environmental Documents) | 51 |
| Pollution Control Data (Environmental Control) | 24 |
| Powers of Attorney - Law | 48 |
| Powers of Attorney - Patent | 56 |
| Price Sheets, Bulletins | 54 |
| Printouts | 15 |
| Procedural Manuals - Administrative | 10 |
| Product Guarantees | 54 |
| Product Quality Specifications | 54 |
| Product Shipping Specifications | 54 |
| Product Strategies | 58 |
| Procedures, Testing & Analytical, Manufacturing | 51 |
| Process or Facility Operating Manual | 50 |
| Process Technology | 50 |

Index (Continued)

| | | | |
|---|--------|---|--------|
| Product Engineering Drawings | 23 | Real Estate & Personal Property Tax | 66 |
| Product Group Data Books | 36 | Receiving Reports | 65 |
| Product Project Engineering Manuals | 23 | Record — Definition | 8 |
| Product Warranties | 18 | Record is Relevant to more than One Subject | 7 |
| Profit by Products & Product Groups | 39 | Record of Alcohol Use | 50 |
| Profitability | 39 | Registers, Accounting | 33 |
| Profitability Studies | 39 | Regulatory Agencies Materials | 27, 48 |
| Programs — Computers | 14 | Renegotiation | 40 |
| Programs — Data Processing | 14 | Reorganizations — Corporate Records | 20 |
| Progress Photos — Enviro-Chem Projects | 25 | Reports — Administrative | 10 |
| Project Control — Enviro-Chem | 25 | Reports — Scientific & Technical | 63 |
| Project Cost — Enviro-Chem | 25 | • Interim | 63 |
| Project Design Manuals | 23 | • Final | 63 |
| Project Files | 24 | • Tentative Process | 63 |
| Project Management — Enviro-Chem | 25 | • Literature Survey | 63 |
| Project Performance Reports | 36 | • Special, Product and Summary | 63 |
| Project Records — Enviro-Chem | 25 | Reports — Financial | 38 |
| Project Schedule — Enviro-Chem | 25 | Request for Deviation from Records Manual | 6, 69 |
| Property Additions & Construction | 37 | Requisitions | 59 |
| Property Cards | 37 | Results Review | 42 |
| Property Master Listings | 15, 37 | Returnable Container Inventory Ledger | 35 |
| Property Repair Records | 37 | Returnable Container Receiving Reports | 35 |
| Property Retirement Records | 37 | RIF Notices under OWPBA | 46 |
| Property Transfer Records | 37 | Risk Management | 61 |
| Proposals — Enviro-Chem | 26 | • Insurance Policies | 61 |
| Proxies & Proxy Lists | 22 | • Annual Insurance Policy Schedule | 61 |
| Public Relations — Press or News Release Communications | 11 | • Insurance Claim & Reimbursement Request Files | 61 |
| Publications — Monsanto Originated | 12 | • Workmen's Compensation Claim Files | 61 |
| Publications — Other | 11, 12 | • Insurance Certificates Furnished by Contractors | 61 |
| Published Papers & Speeches | 11 | • Correspondence Regarding Litigation | 61 |
| Purchase Agreements | 18 | Royalty Payments & Receipts | 40 |
| Purchase Order Files — Enviro-Chem | 26 | -S- | |
| Purchase Orders | 18, 59 | Safe Handling Procedures | 52 |
| Purchase Requisitions | 59 | Safety | 30, 52 |
| Purchasing | 59 | Safety Manuals & Instructions | 52 |
| • Purchase Requisitions | 59 | Safety Training Records | 30 |
| • Purchasing Statistics | 59 | Salaried & Wage Employees – General | 41 |
| • Shipping Requirements | 59 | Salary & Wage Garnishments | 44 |
| • Technical/Commercial Information | 59 | Salary Increase Planning Sheets | 46 |
| • Vendor Lists | 59 | Sales & Use Tax | 67 |
| Purchasing — Enviro-Chem | 26 | Sales Call Reports | 53 |
| • Commitment Sheet | 26 | Sales Contracts and Agreements | 19, 55 |
| • Material and Equipment Status Report | 26 | Sample Recording Control | 63 |
| • Operating/Maintenance Manuals | 26 | Scientific and Technical | 62 |
| • Purchase Order Files | 26 | Scope of Manual's Applicability | 6 |
| Purpose Served — Definition | 9 | Scope Reports and CEAs/EAs | 23 |
| -Q- | | Searches, Trademarks | 57 |
| Qualifications to do Business | 21 | SEC Reports | 21, 22 |
| Quarterly Reports to the President | 10 | SEC Annual Report | 21, 22 |
| -R- | | Securities, Evidence Thereof | 21 |
| Rate, Route, Classification Negotiations | 65 | Securities/Stock Records | 21 |
| Rate—Route File | 65 | Security Manual | 12 |
| "Read Only" — Memory Storage | 14 | Selected Accounting Reports | 32 |
| Real Estate | 60 | Settlements and Releases of Legal Claims | 49 |

Index (Continued)

| | | | |
|---|------------|--|--------|
| Shareholder, Reports | 11, 22 | Test Data, Manufacturing | 52 |
| Shareowner Communications | 11 | Test Data Control Purposes | 52 |
| Shareholder Inquiries | 22 | Testing/Analytical Procedures | 51 |
| Shareholder Ledger | 22 | Three Fifty-Nines (359's) | 42 |
| Shipping and Transportation | 64 | Time Cards, Time Sheets | 43 |
| Shipping Notices | 65 | Time Cards, Time Sheets Temporary Workers | 46 |
| Shipping Papers | 35 | Title Insurance Policies | 60 |
| Shipping Requirements | 59 | Title Opinions | 60 |
| Skills Inventory | 45 | Trade Association Materials | 13 |
| Social Security Tax | 66 | Trademark | 57 |
| Special, Product and Summary Reports | 63 | Trademark, Evidential | 57 |
| Specifications — Manufacturing | 50 | Trademark & Copyright Registrations | 57 |
| Specimen Copy — Contracts & Agreements | 19 | Trademark Searches | 57 |
| SRC | 63 | Training Courses, Employees | 30, 42 |
| State & Local Income or Earnings Tax | 67 | Transcribed Shorthand Notes/Dictation/Voice Mail | 12 |
| State & Local Personal Income Tax | 67 | Transportation Equipment and Facility Records | 65 |
| State Income & Franchise Tax Records | 67 | Travel Statements | 40 |
| Statement of Capital Additions and Replacement and Summaries | 37 | Trial Balances | 33 |
| State Oil & Gas Production & Severance Tax | 67 | Toxicity | 29, 30 |
| State Unemployment Tax | 67 | Toxicology | 29 |
| Status Reports, Accounting | 32 | •Advisory Information on Toxicity | 29 |
| Statutes and Regulations Governing Transportation | 65 | •Product Information | 29 |
| Stock Certificates, Cancelled | 21 | •Study Reports | 30 |
| Stock Certificates, Lost | 21 | | |
| Stock Transfer Sheets | 21 | -U- | |
| Strategies — Industry | 58 | Unemployment Tax Return | 67 |
| Strategies — Customer | 58 | Utilization Plant Facilities | 36 |
| Strategies — Market | 58 | | |
| Strategies — Product | 58 | -V- | |
| Study Reports, Toxicity Studies | 30 | Variation Orders — Enviro-Chem | 25 |
| Submitted Ideas & Releases from Outside Inventors | 57 | Vendor Lists | 59 |
| Summary Long Range Plan | 58 | Vendor Masterfile | 32 |
| Superseded — Definition | 9 | Videotapes and Film | 13 |
| Supplier Acknowledgments | 59 | Visitor Logs | 12 |
| Supporting Papers, Contracts | 17 | Voice Recordings | 12 |
| Surveys and Audits, DM&HS | 28 | Vouchers — Oil & Gas Activities | 40 |
| Systems, Enviro-Chem | 25 | | |
| | | -W- | |
| -T- | | W-2 | 43, 66 |
| Tariff Schedules | 65 | W-2, W-4, 1099 & Related Records | 43, 66 |
| Tax | 66 | W-4 | 43, 66 |
| Tax Audits | 33, 66 | Wage and Rate Schedules | 43 |
| Tax Matters | 66 | WARN Notices | 46 |
| Tax Opinions, Studies | 67 | While Useful Only — Definition | 9 |
| Tax Report Reserves | 15 | Workmen's Compensation Claim Files | 46, 61 |
| Tax Rulings & Opinions | 67 | Work History | 42 |
| Tax Summary Reports (Employees) | 43 | | |
| Technical — Engineering | 24 | -Y- | |
| Technical Data — Pertinent to Distribution | 65 | Year Originated — Definition | 8 |
| Technology Pertinent to Patent Activity | 57 | Year-End Tax Depreciation Computations | 15 |
| Telephone Directories | 13 | | |
| Temporary Employee Performance Reports | 45 | | |
| Ten Ninety-Nine (1099) | 31, 43, 66 | | |
| Tentative Process | 63 | | |
| Termination — Definition | 9 | | |
| Test & Analysis Results | 51 | | |